

Radio Control

TRUCK OF THE
YEAR!

CAR ACTION

THE WORLD'S LEADING R/C CAR MAGAZINE

August 1998

14 car
PERFORMANCE
PACKED ISSUE



5 BIG
THRASH
TESTS

OFNA **Z10 PRO NITRO**

TAMIYA **DAVID JUN
LIMITED EDITION**

LARO **D2 DIABLO**

KYOSHO
ESCORT RALLY

HPI **NITRO
RS4 RACER**

SMALL SOLDIERS
R/C GOES HOLLYWOOD



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ON THE COVER: 1998 Truck of the Year, Team Associated's RC10T3; OFNA's Z10 Pro Nitro puts down the power; "Small Soldier"'s R/C-fortified commandos; Budget Buggy contenders, left to right: MRC Vortex, Kyosho Outrage, Schumacher Cougar, Tamiya Mad Bull, Team Losi Double-X Sport, Team Associated B3 Sport and Tamiya Fighter RX.

August, and we're sizzlin'

It gets tougher and tougher to pick the winner of our annual *R/C Car Action Truck of the Year* award. Most of the racing truck kits now available are of high quality and were designed by people who really know off-road racing. After weeks of debate, we chose Team Associated's all new RC10T3, and in this issue, you can find out which features a truck must have to win this prestigious award.



Looking to get started in off-road racing but not sure your budget will allow it? Well, you're in luck because there are now many affordable, hobby-quality 2WD off-road buggies. Our **Budget Buggy Guide** contains information on just about every sport-level racing buggy, and they're divided according to price and features and rated for overall quality and performance. Don't buy until you've checked out this special feature.

R/C goes Hollywood. I bet most of you have seen the ads for the movie "Small Soldiers," but I



bet you don't know that R/C has a starring role. That's right! The characters—action figures and their vehicles—are radio controlled by Futaba transmitters and other R/C electronics. We give you an exclusive, behind-the-scenes look at the making of a blockbuster.



The world's top 1/10- and 1/8-scale off-road racers met in Las Vegas, NV, for the **Silver State Nitro Challenge**. If you think that R/C gas off-road racing offers much of the same excitement as full-scale, bad-to-the-bone off-roading, you're right! And there's more to fill that need for speed in our coverage of the **10th Annual April Fools Classic**. If you like air time, you won't want to miss this.



And, of course, we have our famous "Thrash Tests"—more than usual this month: the OFNA Nitro Z10 Pro, Tamiya TAO3F Pro David Jun Limited Edition, Kyosho Escort Rally 1/10 electric, Laro 1/8-scale gas off-road buggy and HPI Nitro RS4 Racer ... and a whole lot more. Enjoy.

George M. Gonzalez
Senior West Coast Editor

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Dogs of Wisdom

I just spent an hour looking at Chris's wonderful "Back Lot." I wish I had found the one that you masterfully authored about how it's better to practice driving skills. Well, I wasted a bunch of money on a nitro touring car—loading a bunch of stuff onto a chassis that included a 2-speed, tuned pipe and O.S. CV-X. As I watched it fly, literally, out of control and slam into a curb at speed, I longed for the original mild engine. What really annoys me is that when I race a completely stock, old F102 Tamiya F-1 chassis with the bushings and everything, I kick butt. I'm fixin' to sell that hopped-up tourer.

Like Luna is to you, my dog, Vicki, is the source of all my knowledge. Keep being cool! [email] PATRICK

Yeah, Patrick, an important part of winning races is to stay on the track. Sometimes, those hop-ups just send us flying if we're not ready for them. The secret is to upgrade gradually as your skills improve. Give Vicki a cookie and a kiss on the top of her head for me. What a good girl!—CC

Calling all 4WD Lovers

You have the best R/C mag there is. I look forward to it every month. I am relatively new to the sport, and I just started racing my XX-4.

The only problem is that so far, everywhere I have raced (SoCal) there aren't enough

4WDs to make a separate class, and I get put in with the 2WD buggies or trucks (I have the new truck body for the XX-4). Also, at SoCal, I was told that because I have an unfair advantage, my results would not count. That was fine with me. But then when I TQ'd and was supposed to have the pole for the A-main, I got put in the back of the pack in the B-main. When I asked why, I was told that I would interfere with the other drivers and mess up their results. They said I would probably not be able to race here much longer with my 4WD.

I bought this car because that's what I wanted. I put a lot of time and money into it, and I don't want to sell it and buy something else just so I can race. I would like to organize all the people in my area who own 4WDs and want to race (buggies, trucks, Losi, Yokomo, or HPI; it doesn't matter). If I can get enough people together, we can have a 4WD class. Can you help? I live in Torrance, CA, and can be reached at (310) 970-2870 (pager); email: shredman69@aol.com. [email] BERRY

Berry, don't complain! I think SoCal was nice to let you race at all. They put you in the back to handicap your

obvious advantage. Two-wheel-drive and 4WD simply shouldn't race together—period. I hope publishing your number and email address will help you connect with other 4WD lovers.—CC

A Non-Believer

Chris's article on the advantages of tuned pipes did not impress me. I don't think the "waves" make that much difference. I think the expansion chamber on my HPI beats the tuned pipe because the gases have a shorter distance to travel, and I can remove the baffle so the exhaust is free-flowing. Look at cars, for example: top fuels and funny car dragsters have only headers, and NASCARs have only side exhausts. If I had the skill, I would fabricate an exhaust system that consists of a single-piece header pipe. No more mufflers! That's it! [email] MABAHONG TAE (tah-eh)



Top fuel and funny car dragsters and NASCARs have 4-stroke engines that breathe totally dif-

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

INTERNET ADDRESSES:

Chris Chianelli: chrisc@airage.com
George Gonzalez: georgeg@airage.com
Peter Vieira: peterv@airage.com
Greg Vogel: greg@airage.com

ferently. Anything with a 2-stroke will benefit from the resonance a tuned pipe generates. That's why all top 1/10-scale nitro drivers (on- and off-road) use pipes, and all 1/8-scale drivers (on- and off-road) use pipes. These guys are serious and don't add pipes (and weight) for the fun of it or because they have nothing better to do with their time and money. I wouldn't steer you wrong, man. Pipes work!—CC

It's Normal

I own a Team Losi GTX gas truck with a .12PD engine. Every time I finish running it, I find gas deposits on my chassis around the engine. I don't know where it's coming from. Is this normal? If it isn't, what can I do to stop it? Please help! [email] BRYAN S.

Bryan, the mess is part of having a glow engine. The oil is in the fuel, but it doesn't burn as it does in gasoline ignition engines, so it gets all over everything. It's normal.—CC

ERRATA

In the June 1998 issue, our "Racing Servo Guide" included 56 servos. With the aid of the products' manufacturers, we spent countless hours preparing the information in the servo charts, but a computer error moved several columns in the JR chart. We apologize for this and print the correct chart here.

JR SERVO	Torque (oz./in.)	Speed sec./60°	Bearing/Bushing	Dimensions WxLxH (in.)	Weight (oz.)	Gear type	Suggested application	List price
Z250 Standard Race Servo	49	.19	Bushing	.73x1.52x1.32	1.47	Plastic	Sport cars, trucks and boats	\$24.95
Z550 Premium	62	.17	Single BB	.73x1.52x1.32	1.47	Plastic	Sport cars, trucks and boats	\$44.95
Z2750 Super Race Servo	61	.09	Dual BB	.73x1.52x1.29	1.84	Metal	1/10 and 1/8-scale cars and trucks	\$179.95
Z3550 Mini Race Servo	38	.11	Dual BB	.58x1.30x1.02	1.61	Plastic	1/12-scale cars	\$89.95
Z4750 Ultra Race Servo	96	.12	Dual BB	.73x1.52x1.32	1.72	Plastic	Comp. 1/10 and 1/8-scale	\$109.95
S4735 Ultra Speed Coreless	90	.15	Dual BB	.73x1.52x1.32	1.72	Plastic	Comp. 1/10 and 1/8-scale	\$114.95
S3025 Mini Ultra-Speed	29.2	.15	Dual BB	.58x1.30x1.02	1.61	Plastic	1/12-scale cars	\$89.95
S605 Monster FET	139.1	.28	Dual BB	1.26x2.5x2.3	4.75	Plastic	1/4-scale cars and trucks	\$139.95

This image was so gorgeous that I just had to put it on my first page. I want to introduce you all to Lucas Racing and its totally awesome line of 1/5-scale H.A.R.M. gas/ignition cars. This Mercedes CLK-GTR beauty comes complete, minus a radio. If you want, Lucas will set up the car for you with your choice of radio. Steve Pond and I drove it and agreed that with its Solo spark-ignition engine and long pipe, the Mercedes has excellent acceleration, and the H.A.R.M. chassis and suspension keep the power under control. This machine acts much like a full-scale racer and warns when things are about to go awry so you can correct them.

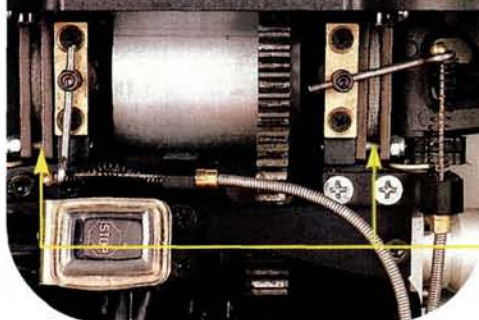
TOTALLY AWESOME MERCEDES



Left: the robust clutch-bell mounting maintains centering and gear mesh even under high-torque conditions.

It's a known fact that the most beautiful women are fans of F1, GT-1 and GTR full-scale racing. Not being one to break certain traditions (others I smash with alacrity), I thought it only appropriate to use Air Age's stunning Susana Silva to give some perspective to the Mercedes' size. Watch for a full test of this exciting new product.

Lucas Racing, 912 Mt. Washington Dr., Los Angeles, CA 90065; (213) 221-5537; fax (213) 221-5587.

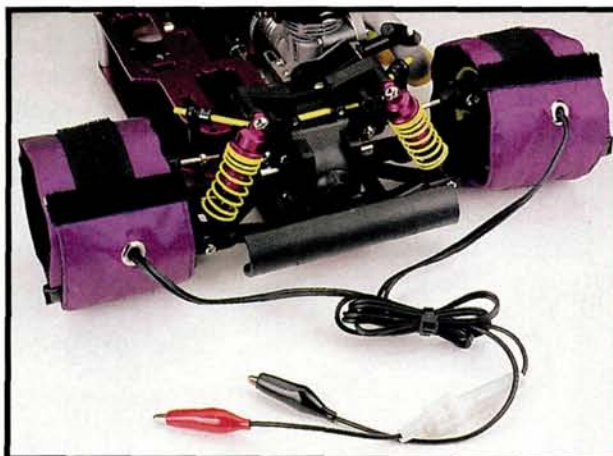


Above: rear offset shock rocker arms take more advantage of greater shock sweep than a center-mounted rocker would.

Left: on either side of the diff housing are the inboard disk brakes. The in-board position lowers unsprung weight.



Formula 1-style inboard shock with offset bellcrank rockers. Note the tie rods that go forward to the anti-sway shaft.



Trinity heats things up

Ever wonder why Indycar drivers do that strange zigzag thing with their cars at the beginning of the race? To heat up the tires! Why? Warm rubber has better traction, and it's exactly the same with R/C cars. It takes a couple of laps to heat a set of touring-car rubber or capped tires enough to soften them for optimum traction, and the process takes even longer in cooler weather and at night.

Trinity's tire warmers will warm up your tires, so you'll have great traction right from the starting bell. The warmers were designed according to the same simple principle as those used in Formula 1: wrap a warmer connected to a power source (these units operate at from 7.2 to 12 volts) around a tire, and it will make the tire softer and stickier. The warmers are also good for use on speedway cap tires and for drying traction additive on foam tires.

Trinity Products Inc., 36 Meridian Rd., Edison, NJ 08820; (732) 635-1600; fax (732) 635-1640; website: www.teamtrinity.com.

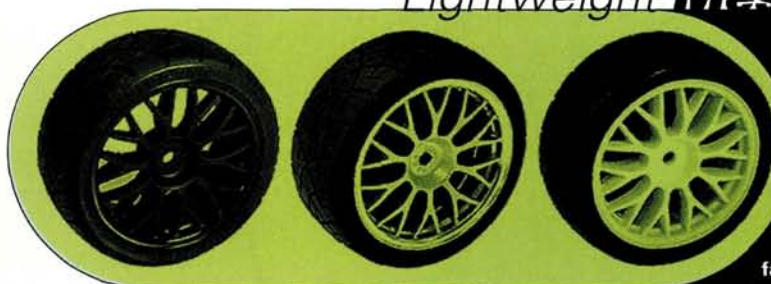
Protoform Mercedes CLK-GTR

The new FIA GT1 category was dominated by one of the most amazing race-cars ever built: the Mercedes CLK-GTR. Protoform's latest race body captures the excitement of this car. Designed to fit all popular 4WD and FWD chassis, this 190mm-wide body's intricate details and overall proportions will appeal to scale enthusiasts and serious racers. Its features include: add-on wing with attachment hardware; window masks to make painting easier; and a detailed decal sheet. Protoform's CLK-GTR is sure to live up to the reputation of its full-size counterpart by combining style and speed!

Protoform, P.O. Box 456, Beaumont, CA 92223;
(909) 849-9781.



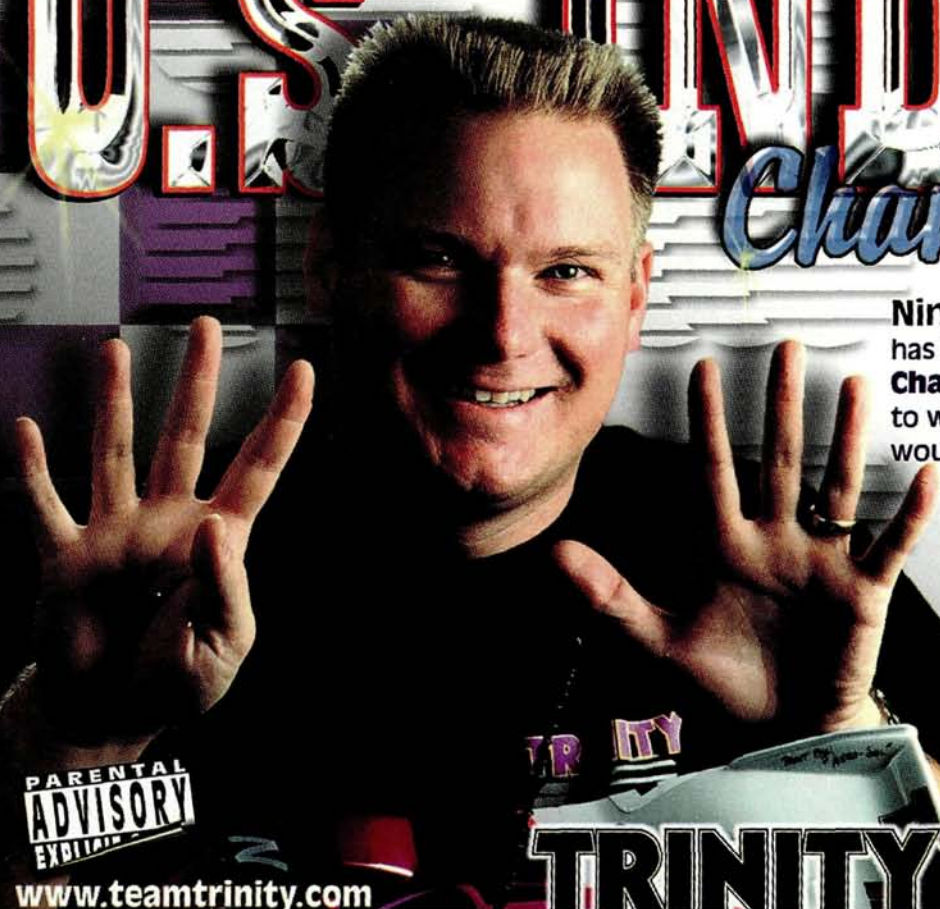
Lightweight Mesh Wheels



HPI Racing is proud to announce this addition to its extensive line of touring-car wheels. Full-scale racing cars use the mesh design because it's light, very strong and looks great. The HPI chrome mesh wheel has all of those benefits and is available in white, black and chrome—all three colors with both zero or 3mm offset. Size and offset information is molded right in as part of the manufacturing process, and the wheels' "polished lip" design will add a distinctive concours look to any car.

HPI, 15321 Barranca Pky., Irvine, CA 92618; (714) 753-1099;
fax (714) 753-1098.

U.S. 4 CELL INDOOR Championships



Nine Times Joel "Magic" Johnson has been crowned the **U.S. 4 Cell Indoor Champion**. No other driver has been able to win the title more than twice. In fact it would take the next six winners totals just to equal Joel's domination of this event.

The **D3** modified motors, **VIS EX-TRA** Sanyo-RG-2000 battery packs and **Switch Blade 12sj** that helped Joel win his 9th title can help you win your first!



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TRINITY

The new all-terrain/all-season Nitro Blizzard is an ideal, year-round, go-anywhere action machine, and it's the first tracked vehicle to feature Kyosho's exclusive Quick Reverse Clutch (QRC)—a clutch that, in time, could prove to be a significant R/C engineering breakthrough. Specially modified for crawler tractor use, the QRC allows modelers to instantly shift this nitro machine into reverse with a 2-channel radio. The Nitro Blizzard's other performance features include a built-in, 2-speed transmission that produces steady power and speed, a newly designed steering system for excellent maneuverability, and a powerful GS-11X engine with heavy-duty recoil starter for fast, easy starting.

Specifications: length—14.4 inches; width—12.6 inches; height—8.6 inches; ground clearance—1.2 inches; weight—5 pounds; engine—Kyosho GS-11X (included). I think every off-road track needs one to help clear off the wreckage after those first-turn pile-ups.

Great Planes Model Distributors, 2904 Research Rd.,
Champaign, IL 61826-9021; (217) 398-6300.

Kyosho Nitro Blizzard **TUNDRA FUN!**

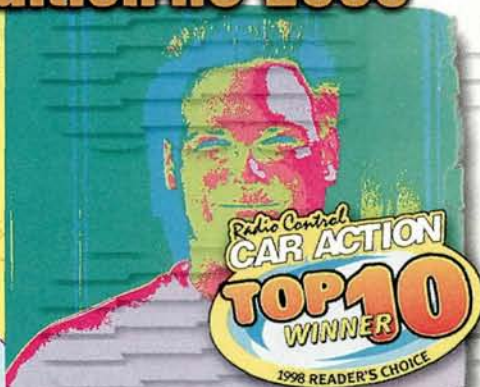


INSTANT STRIKE

This is Kyosho's Mantis Series Dodge Viper GTS-R, and it comes 90 percent assembled to get you to the track fast. Three versions are available: electric-powered, nitro-powered (with a pull-start GX-12CR engine) and electric-powered ready to run. The awesome body is a perfect fit for the Kyosho Pure Ten 4WD chassis and most other 190mm Kyosho sedan chassis.

If you'd like to know more about the Viper, contact Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-1104.

Joel Johnson VIS EX-TRA Team Edition RC-2000



'98 ROAR INDOOR TOURING CAR NATIONAL CHAMPION

Joel Also Used:

TK3001, \$17.99	Steering Ball Bearings
TK3009, \$8.99	Blue Anodized Rear Suspension Brace
TK3012, \$19.99	Blue Anodized Motor Mount Clamp
TK3025, \$12.99	Blue Anodized Servo Mount
TK3028, \$23.99	Blue Monster Motor Heat Sink
TK3033, \$5.99	Foam Bumper
TK3040, \$10.99	64 Pitch Gear Adapter
TK3037, \$3.99	Purple Congo Shock Springs, (.065)
RC7100, \$3.50	100 Weight Trinity Silicone Shock Oil
RC6073, \$8.99	Touring Car Tire Tamer

TRINITY

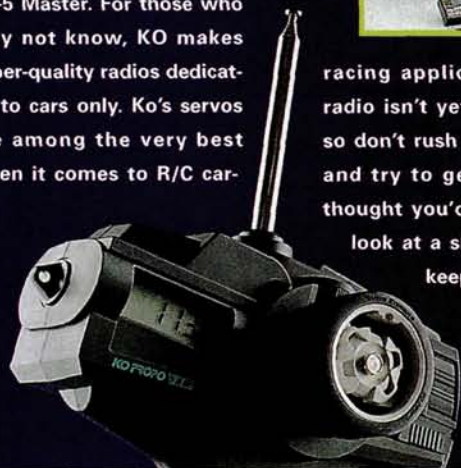
www.teamTRINITY.com

Dirtinator 3 Modified Street Weapon Trinity

KO SPY SHOT

My undercover people in Japan uncovered—hmm ... why don't they call them "uncover people"?—KO's EX-5 Master. For those who may not know, KO makes super-quality radios dedicated to cars only. Ko's servos are among the very best when it comes to R/C car-

... racing applications. This radio isn't yet in the USA, so don't rush to the phone and try to get one. I just thought you'd like a sneak look at a sleek radio. I'll keep you posted.



Sleek Italian from Protoform

For '98, Alfa Romeo has abandoned the sharp-edged look and has given its 156 Sedan a slippery, all-new aerodynamic look while retaining the distinctive Alfa triangular grill. As we have come to expect from Protoform, it has not only carefully recreated the beautiful lines of the 156 in 1/10 scale, but has done it first, too. This all-out racing body fits all popular 190mm-wide 4WD and FWD chassis. The body comes with an add-on wing, mounting hardware, window masking and detail stickers, and it meets all ROAR, NORRCA and IFMAR specs.

Pro-Line, P.O. Box 456, Beaumont, CA 92223; (909) 849-9781; fax (909) 849-2968.



OFNA LINEUP

Introducing OFNA's new sedan-wheel lineup! These beauties are 1.9 inches in diameter and 26mm wide—the legal limit. Made of high-impact nylon, the wheels will fit all hex-drive hubs and adapters used on the touring-car race scene. As you can see, they're also offered in a variety of colors and finishes in both star and 5-spoke patterns.

OFNA Racing, 22600 Lambert St., Ste. D-1009, Lake Forest, CA 92630; (714) 586-2910; fax (714) 586-8812.

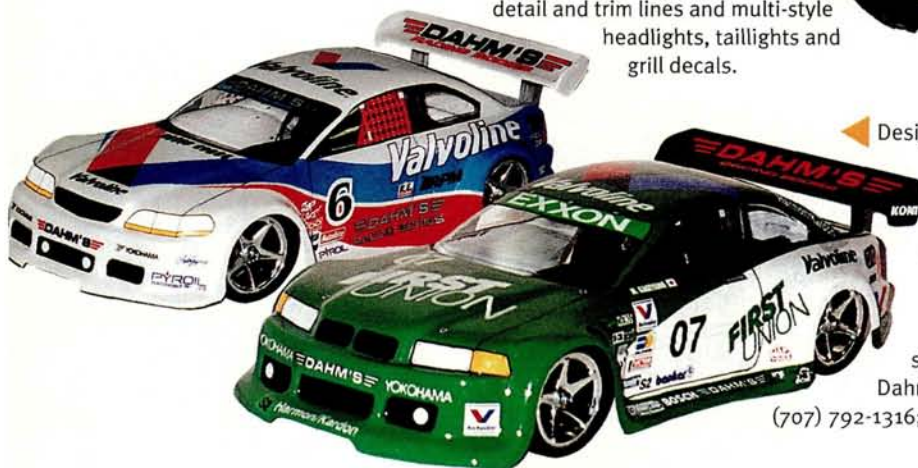
Dahm On Dahm Off

Ira Dahm certainly keeps them coming! First up is the '98 Super Sport 454, which was designed to fit most 1/10-scale monster trucks—the Stampede, Sledgehammer, USA-1, Tracker, Nitro Tracker, MT-10M, JRXT, RC10T, Clod Buster/Bullhead and King Blackfoot, for example. The Super Sport 454 features tailgate spoiler, optional bolt-on spoiler, bolt-on number plates, molded-in detail and trim lines and multi-style headlights, taillights and grill decals.



Designed for touring-car chassis, the 190mm GT Extreme body series fits Tamiya, HPI, Kyosho, Losi, Yokomo, Tenth Technology, OFNA, Roadrunner, Schumacher and ABC chassis and features low-slung styling with ground effects. Other features include: multi-style headlights; taillights and grill decals; Extreme wing; new, realistic, aerodynamic wing strut; and molded-in detail. Both bodies are available in light 0.030 and strong 0.040 Lexan.

Dahm's Racing Bodies, P.O. Box 360, Cotati, CA 94931; (707) 792-1316; fax (707) 792-0137.



"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, R/C Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. If we choose to feature your creation, you'll receive a 6-month subscription to Car Action, or an extension of your existing subscription. You'll also be eligible for the eighth annual "Readers' Rides of the Year Contest" in the fall of 1998. In case we need to contact you, write your address and phone number on your letter and on the back of every photo you send. Good luck!



One for Fun, One for Show

Dustin Smith of Advance, NC, uses his Losi XX 'CR' for fun and racing, while his Traxxas Stampede is decked out for show and a little road action. The Losi is equipped with a Novak Tempest ESC and a Trinity Midnight 2 motor; a Novak Mercury receiver pulls in the radio signals. The electric Stampede has a Kyosho Magnetic Mayhem motor and a Futaba ESC. The rims are HPI Super Stars fitted with Pro-Line tires. Both cars use Futaba radio gear and Trinity Ex-Tech batteries.

Canadian Conversion 4WD

This photo of a cool Losi XX-4 was sent to us by Jeff Cabralda of North Vancouver, BC. First, Jeff fitted the buggy with Losi's new XX-4 truck body. Under the body lies a Novak Tempest Max speed control, a Trinity D3 motor and a matched 2000mAh battery pack from Competition R/C. Jeff uses a Futaba Magnum Sport radio system to control his car, with a Hitec 605BB servo for the steering. Jeff is really impressed with the truck's speed, while his wife is impressed with its looks.



Truck Oval Racer

Joe Madonia of Lake Stevens, WA, has an RC10GT with loads of hop-ups and tuning refinements. Joe has added a Raceworks chassis, Lunsford tie rods, MIP steering and Pro-Line foam tires with custom-cut treads. To tune the car, he used 15-degree front caster blocks, RPM rear carriers, Robinson gears and an MIP 2-in-1 clutch. The truck is powered by an O.S. CZ-Z engine. The large wing on the top is a Barts wing mounted directly to the chassis for maximum effect. Joe races the truck and is trying to form a modified gas class at his local racetrack.

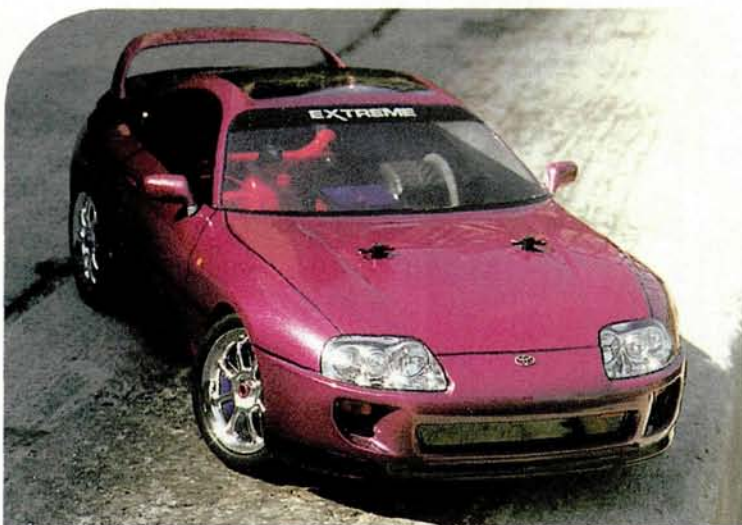


Mini Magic

Tony Gosnell from Dargaville, New Zealand, wants everyone to check out his Tamiya Mini Cooper. He runs a Trinity Diamond 12-turn double motor with a Futaba speed control. The car has a full set of bearings and various custom-made aluminum parts to increase its durability. The rims are Honda-style wheels, and the body is from Frewer. Tony says the car is so fast it seems to float, and soon, he will join a local club to do some serious racing.

Street-Spec Specials

Paul Kostura of Fountain Hills, AZ, just wants to race for fun; that's why he got into street-spec racing. His local racetrack enforces strict rules to keep everything fair; motors are handed out at the beginning of the day and swapped at the end. The cars are fitted with Parma Mustang bodies and PSE Gold Star Velocity wheels and tires, and Associated SS chassis with Composite Craft swaybars are used. Paul uses Airtronics radio gear and Novak and Tekin speed controls, and he says that with the minor modifications that are allowed, the cars are really hooked.



Souped-Up Supra

Reggie Marshall from Queens, NY, put a lot of work into his Tamiya Blitz Toyota Supra, and it shows. The TAO2 chassis uses a Maxtec Shockwave motor and a Dynamite 2000mAh battery for power. A Futaba Magnum Junior radio controls the Novak Super Rooster ESC and the 9304 steering servo. Other chassis features include a full set of bearings and custom swaybars. The body has flashers, a license plate and a fatboy exhaust tip, and Reggie also used RPM rims with Pro-Line tires.

Rummage Rides

Leland J. Thomas of Racine, WI, doesn't mind stopping at rummage sales to see whether any R/C cars are for sale. Let's see what Leland has found so far: his first purchase was a Tamiya Sand Scorchers for \$15; the car was complete and only needed minor repairs. His second bargain was the Ultima II. Leland upgraded the car with a bearing set, a Futaba ESC, gold shocks and a Trinity Green Machine motor. And last, he found an RC10GT Sport. Its upgrades include MIP CVDs, a Stinger pipe and a temp gauge. It sports HPI wheels with Pro-Line tires on all four corners and is powered by an O.S. CZ-Z engine.



Two Cool Trucks

The Associated RC10T2 and Tamiya Toyota Pre-Runner come to us from Ben Storer of Idaho Falls, ID. The RC10T2 uses a Novak Tempest ESC and a JR Python radio. A Trinity motor and Dynamite battery power the truck. The Pre-Runner uses a JR Alpina radio, a Tekin Rebel ESC, a Trinity Midnight motor and a Dynamite battery for the electronics. Both cars use HPI chrome rims fitted with Pro-Line tires, and both have full sets of Dynamite ball bearings.

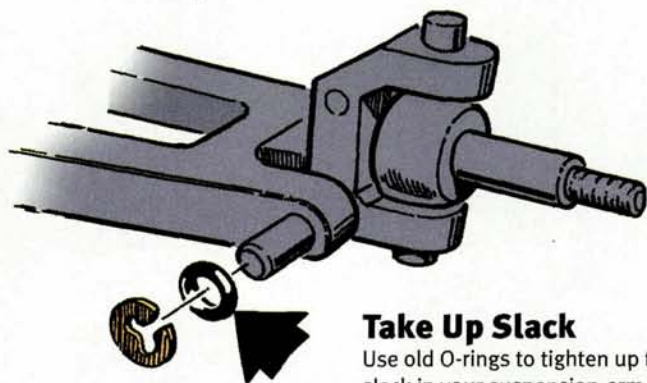


PIT

BY JIM
NEWMAN

workshop ideas & innovations

tips

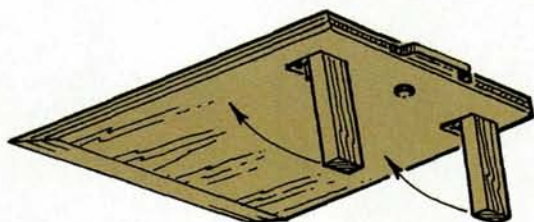


Take Up Slack

Use old O-rings to tighten up the slack in your suspension-arm pivots.

KEVIN HOGBERG

Calgary, Alberta, Canada

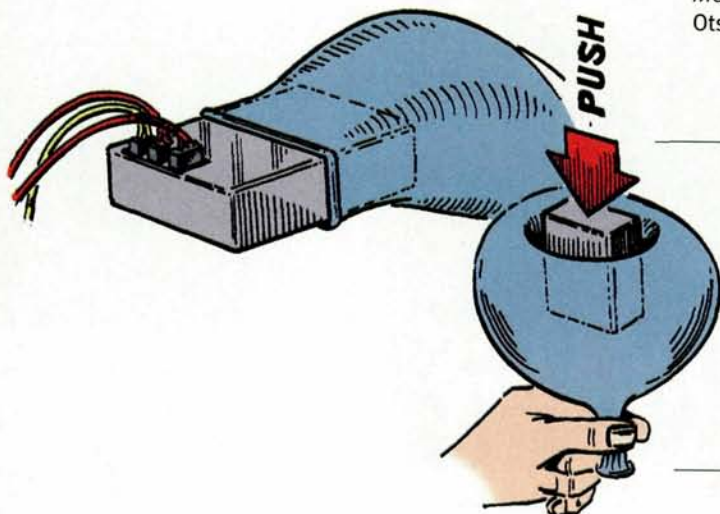


High Jump

Make a jump ramp from 1/2-inch-thick (13mm) plywood about 24 inches (61cm) square, with legs from 2x2 (50x50mm) wood, hinged to fold for storage. Also shown is another way of supporting the ramp, using a piece of hinged ply. Add a handle for easier carrying; drill a hole in the ramp so you can hang it on a nail in your shop.

DEREK KRUMM

Trabuco Canyon, CA

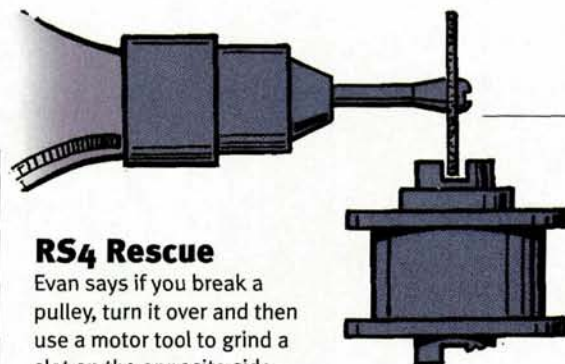


Beautiful Balloon

Balloons are good dust- and water-covers for receivers. You can stretch the balloon's neck and work it over the receiver, or lightly inflate a balloon and then press the receiver into it; as you gradually let the air out, the receiver will be wrapped in rubber! Seal around the wires with silicone sealant from RadioShack.

SCOTT HIEBERT

Altona, Manitoba, Canada



RS4 Rescue

Evan says if you break a pulley, turn it over and then use a motor tool to grind a slot on the opposite side. This will allow you to run until you obtain a replacement.

EVAN TOLL

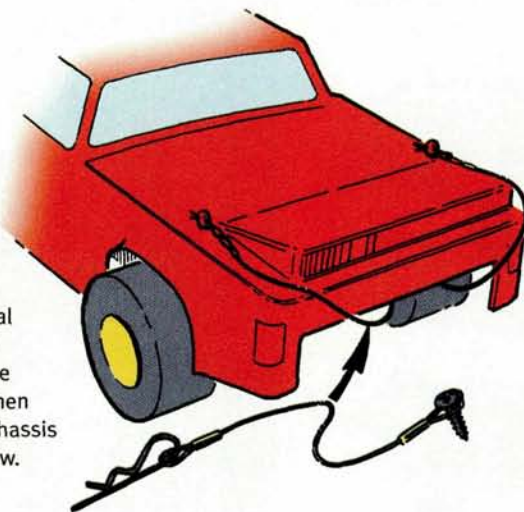
Thornton, CO

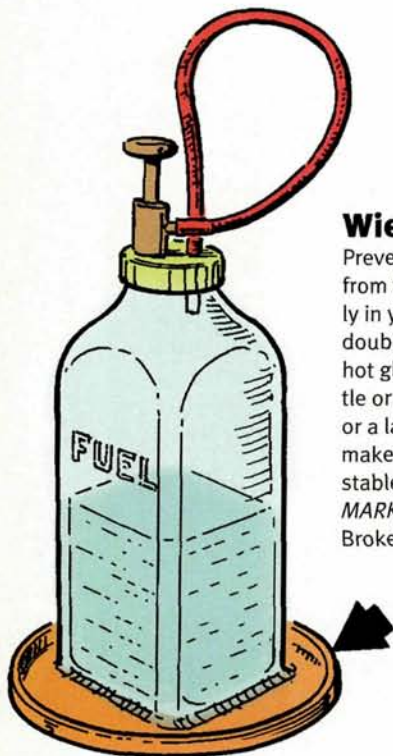
Gone Fishin'

Short, nylon-coated, steel-cable, fishing-line leaders are ideal for retaining your body clips. Simply remove the swivels from the end, then attach one end to the chassis with a self-tapping screw.

MONTE LARSON

Otsego, MN

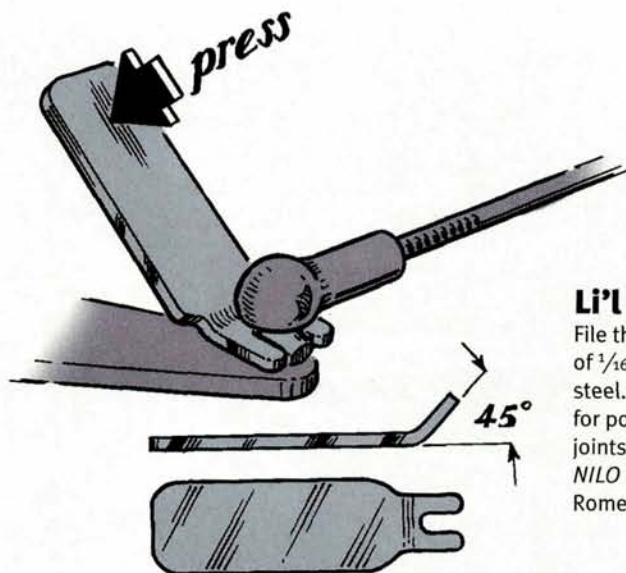




Wiegel's Winner

Prevent your fuel bottle from falling over, especially in your field box. Use double-stick tape, Goo, or hot glue to attach the bottle or can to an old Frisbee or a large plastic lid. This makes a wider, more stable base.

MARK WIEGEL
Broken Arrow, OK



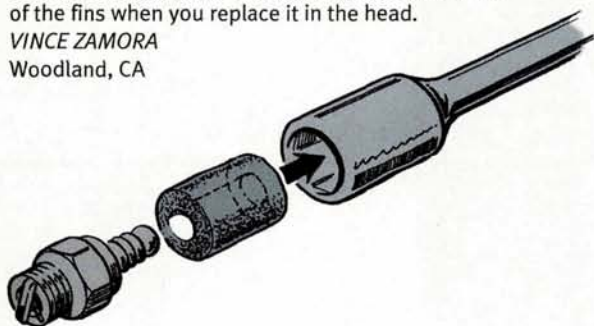
Li'l Pry Bar

File this little tool out of $\frac{1}{16}$ -inch (1.5mm) steel. It is very useful for popping ball joints loose.
NILO VETTORAZZO
Rome, Italy

Get a Grip

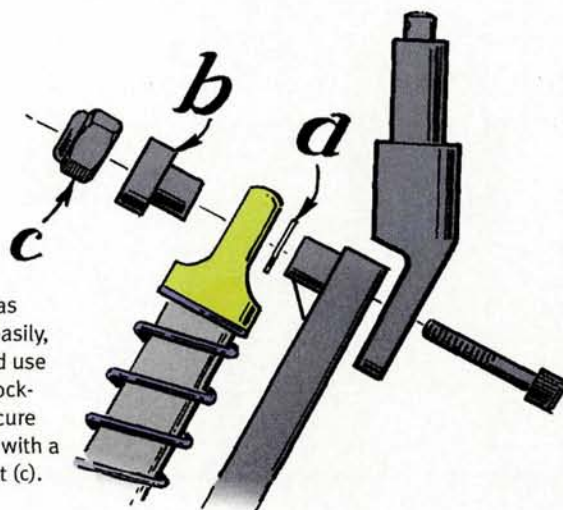
Glue a little piece of rubber fuel line into the top of your plug wrench; it will grip the plug's center post and lift the plug out after it has been unscrewed. It will also allow you to lower the plug into the depths of the fins when you replace it in the head.

VINCE ZAMORA
Woodland, CA



Tackett's Tip

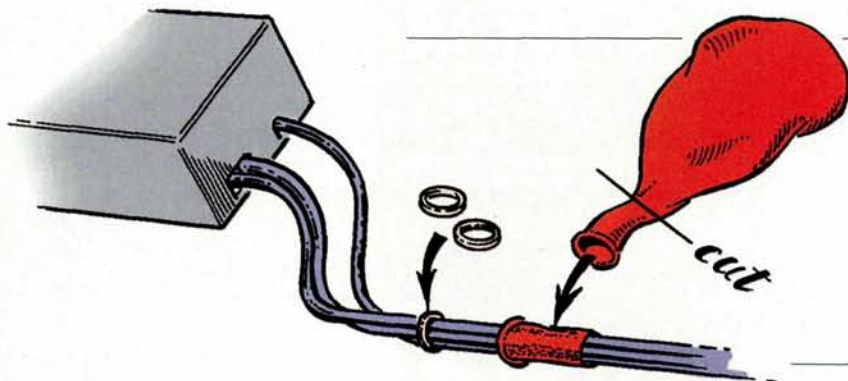
If the front body mount of your Traxxas Stampede loosens easily, add a washer (a) and use the kit's stepped shock-mount collar (b). Secure the whole assembly with a 3mm self-locking nut (c).
NEIL TACKETT
Acme, PA



Bundle of Energy

Neatly bundled wires are less likely to be damaged. Keep them tidy with tiny, orthodontic rubber bands, or cut the necks from party balloons for effective sleeves.

MICHAEL WEILER
West Liberty, IL



If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at *Radio Control Car Action*, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to *Troubleshooting, Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. We regret that, owing to the tremendous number of letters we receive, we can't respond to every one.

Mudder Hummer

About a year ago, I received a Tamiya Hummer. It's a great car (or is it a truck?), and I love taking it through the mud, especially with the power from the Trinity Midnight motor that I installed! The problem is that the spur gear keeps stripping. I must have replaced it at least five times, and every time it happens, I have to buy a whole set of gears. Do any companies make a hardened or 32-pitch spur gear for my car? Would it help if I got an aluminum motor mount? I also find that the rear body mounts sometimes bend forward under impact, and that causes the hidden mounts under the hood to pop off. What suggestions do you have?

BRIAN LEE

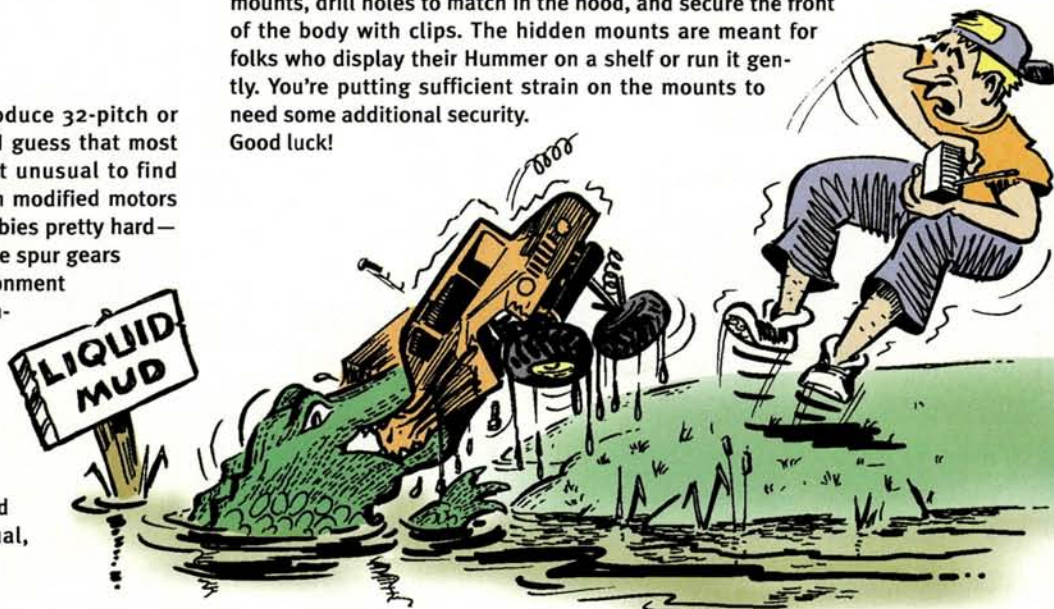
Tyrone, GA

I'm not aware of any companies that produce 32-pitch or hardened spur gears for this series, and I guess that most owners don't have your problem. It's not unusual to find hardcore sedan racers with 11- and 12-turn modified motors in their older TA02 cars—they run those babies pretty hard—but I've never heard of having to replace five spur gears in only a year! My guess is that your environment is the problem—that heavy mud you mention. Either you're heating up the motor so much that it's melting the spur via a super-hot pinion, or the plastic gear teeth are simply the weakest link in an overstressed chain. Of course, it's also possible that you're using the wrong holes in the motor mount for the pinion installed on the Midnight; double-check the manual, just to be certain.

If you really must run your Hummer in the mud, an aluminum motor mount can't hurt. It will ensure correct mesh under a heavy load and will provide a better heat sink. Unfortunately, one of this design's flaws is the minimal airflow around the motor, so you would also be well advised to use a clip-on, finned motor heat sink, like Trinity's narrow, anodized-aluminum unit. This will help the motor live longer and may also help to solve your problem.

As for body mounts, head to the hobby shop and pick up a set of sedan mounts for a TA-series car. Install the front mounts, drill holes to match in the hood, and secure the front of the body with clips. The hidden mounts are meant for folks who display their Hummer on a shelf or run it gently. You're putting sufficient strain on the mounts to need some additional security.

Good luck!



Old-Tech R/C

I own a Team Losi Junior T that I use for backyard bashing. I've taken the time to upgrade and tune it to suit me, but lately it has been on a rampage! Every time I plug in the battery, even if the truck isn't turned on, the motor starts to spin. The brakes don't work, but the steering servo does. If it helps, the radio is a Futaba FP-2B, and the ESC is a DuraTrax DTX-4. I realize that these electronics are a little dated, but they've done a good job for a long time. Any recommendations as to what should be replaced?

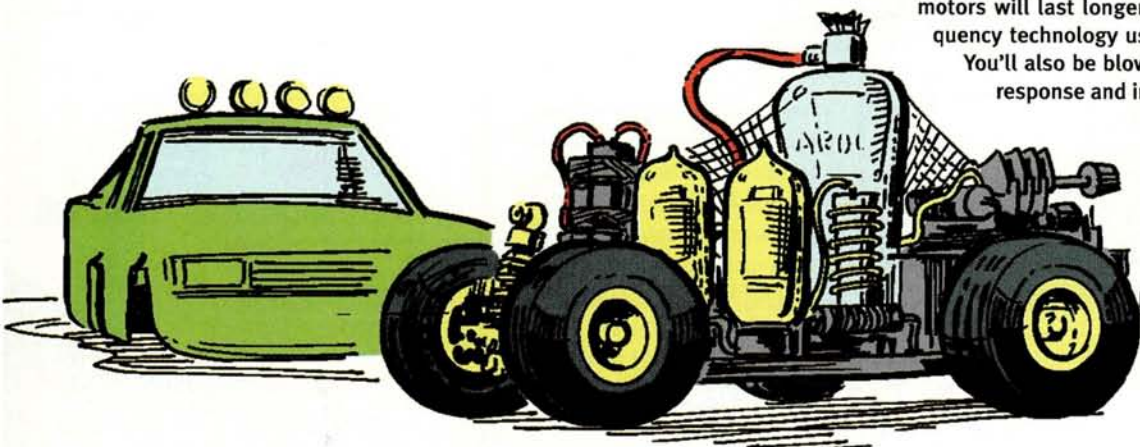
MATTHEW SPURK

Kissimmee, FL

Matthew, it sounds as though you may have to replace or repair some of the electronics on your ride very soon. When the wheels spin, even though the ESC is turned off, you may have blown a FET (field-effect transistor). Although your DTX-4 has worked well for several years, it is a low-frequency design (I'm pretty sure it's based on a 60Hz board), and it may be difficult to repair. For little more than the cost of repairs, on the other hand, you could pick up a new DuraTrax Streak, a Novak Explorer, a Tekin Formula 10, or a similar low-cost, forward-only ESC that has more features, lower resistance and a warranty. As a bonus, your motors will last longer and run cooler due to the high-frequency technology used by these modern speed controls.

You'll also be blown away by the smooth, fluid throttle response and increased run time.

The other good news is that your radio and servo are probably fine and are perfectly compatible with these new ESCs. This is a rare instance where I actually recommend replacement over repair; the newer products are really much better!





ESC Surgery?

About four years ago, I got an RC10T, and it has been great until now. My problem is that my Rooster speed control, which I've had for about a year and a half, just doesn't seem to respond the way it used to. I've been told that I can remove the on/off switch to increase performance; also, there's this extra wire coming out of the speed control. Is there anything I can do to put the "snap" back in my ESC? I really need your help!

SCOTT SCHOENFELDER
Beaverton, OR

Scott, don't even try to repair or modify your speed control! Once upon a time, back when humans assembled ESC components on circuit boards, you might have been able to repair it if you had some basic knowledge of electronics. Today, however, things are much different. High-speed robotic assemblers now complete these "brain boards," which are then tested by trained technicians using state-of-the-art equipment. Although you might be able to replace the ESC power wires without

damaging the rest of it (and even I won't attempt that any more!), anything more complicated definitely requires a trip to the folks who made your unit in the first place. Novak's service department is first-rate and very fast and can get your Rooster back to you in less than two weeks—just as good as new.

Removing the on/off switch won't do anything for performance, by the way, since all it controls is the rather minuscule amperage utilized by the ESC's "brain." The extra wire coming out of your ESC is meant to power a FET-boosted servo and is otherwise left unconnected.

Before sending your ESC back to Novak, you should check the condition of your batteries, connectors and motors. These are much more likely to be the components that are causing the lack of "snap" you describe. Speed controls are like light bulbs: if they work at all, they usually work correctly. Although I've seen an occasional case of brownout in speed controls, it's very rare. Good luck!

Mod Motor

I'm a beginner in this great hobby, and things haven't been going so well for me lately. I started with an Associated RC10T2 and installed a Trinity Kinwold Dirtinator 12-turn modified motor in it. Within three weeks, the commutator had worn down and the truck did not run anymore. I figured that it was probably a fluke motor, so I bought another one just like it. Even though I took good care of the motor and cleaned it regularly, it had burned the brushes in just two runs. I changed to a Reedy Sonic 12-turn double. Although the comm seems fine, this motor has now started to run slower and slower, and it also runs so hot that it has melted the brush springs! I would really like to enjoy my truck, but now it's just sitting on my workbench. I'm appealing to you for help!

MATT MICHELL
Chicago, IL

Matt, I'm curious. When you first started to drive, did you pick up a used slingshot dragster for that commute to work or start skiing by jumping out of a helicopter? I have to give you credit, though, you don't go into anything halfway! I suggest to most beginners that they start out with a mild stock motor, learn how to drive their vehicle, develop some consistent driving skills and then graduate to a hot stock or mild modified motor. You, my friend, went straight to the top of the heap!

As a beginner, you chose (or a friend suggested) the correct motor for a pro-level driver. You sound as if you've become acquainted with the motor's internals, but I suspect you've missed a few lessons along the way. Mod motors have to be geared differently from stockers, especially when the winds get into the low teens. They need a much larger spur and a smaller pinion than the ones that came in your kit. In addition, the motor must be removed and cleaned every run or two. The condition of the brushes is so critical that you may have to replace them after less than half-a-dozen runs, and the commutator should be re-trued after no more than a dozen battery packs. When the brush springs melt, that's a sure sign that the motor is overgeared, and it's very possible that you burned some of the windings on the last motor you purchased.

If you're determined to run a hot mod motor, buy a less expensive, 14-double, machine-wound. Check out the manufacturer's specs for gearing (like in the RC10T assembly manual), or call Associated Electronics (or check out their awesome Web page) to make sure you're using the correct pinion and spur. A 14 double-wind is a lot more forgiving in terms of maintenance, but it still offers bone-crushing performance. When you've mastered this inexpensive motor, you might want to try your hand at the more expensive hand-wounds again.



It's all relative

I recently bought the O'Donnell head for my O.S. CV .12. O'Donnell states this head will provide a 60-degree-cooler running temperature, 15 percent more power, and 40 percent less weight. In the instructions, they give a "racers' tip" to run the McCoy 59 glow plug and 10-percent nitro for optimum performance. The instructions also say you can run 20-percent nitro with the McCoy 8 plug.

Well, Chris, I've tried it all and nothing works. The motor runs super-hot; run temp should be no higher than 220 degrees, and with the O'Donnell head, I was running at 240 degrees!—60 degrees cooler, my !@#*!

I agree with your April article about running on the rich side, and I had

With the O'Donnell head, the temperature sensor is quite close to the combustion chamber—the source of the heat.



With the unorthodox construction of the stock O.S. CV head, which has inter-fin beams and angled fins, the temp sensor is much farther out and higher on the head.



to the combustion chamber—the source of the heat—when mounted on the O'Donnell head than when mounted on the stock O.S. head. The closer to the source, the higher the reading. Also, the stock head is coated, and the O'Donnell isn't. This, too, will affect temperature sensing, as will other things.

Remember, the large fins on the head dissipate heat, and that means they extract internal heat by moving it to the engine's external surface. The closer the sensor is to the internal source—which, by the way, Brian, ranges from 600 degrees to 800 degrees—the hotter the reading. The closer to the outside surface the sensor is, the cooler the reading. Very slight changes in sensor placement will be noticed on the temperature read-out.

With this in mind, it isn't out of the question that while the external temperature reading is hotter on the O'Donnell head than on the stock head, the combustion-chamber temperature (the truly important thing) may in fact actually be cooler with the O'Donnell head than it is with the stock head.

When using the MIP unit—with whatever engine—I do this: on a cool, dry day with fresh 15-percent-nitro fuel that contains 18-percent lubricant (a synthetic/castor mix), I get my engine running really well and slightly rich—just as I did in the days before the MIP temp gauge even existed. I then take that reading, whatever it may be, and use it as a tuning reference point when other variables, such as ambient temperature, nitro content, oil content and humidity, change.

There are drastic physical differences between the O'Donnell head ... and a stock O.S. CV head. As a result, the temp sensor of the MIP unit ends up much closer to the combustion chamber—the source of the heat—when mounted on the O'Donnell head than when mounted on the stock O.S. head. The closer to the source, the higher the reading.

this motor so rich it had no top end and I could not get it to cool off. Yes, I did put the shim from the red head in the new head, and I readjusted any settings that needed adjusting.

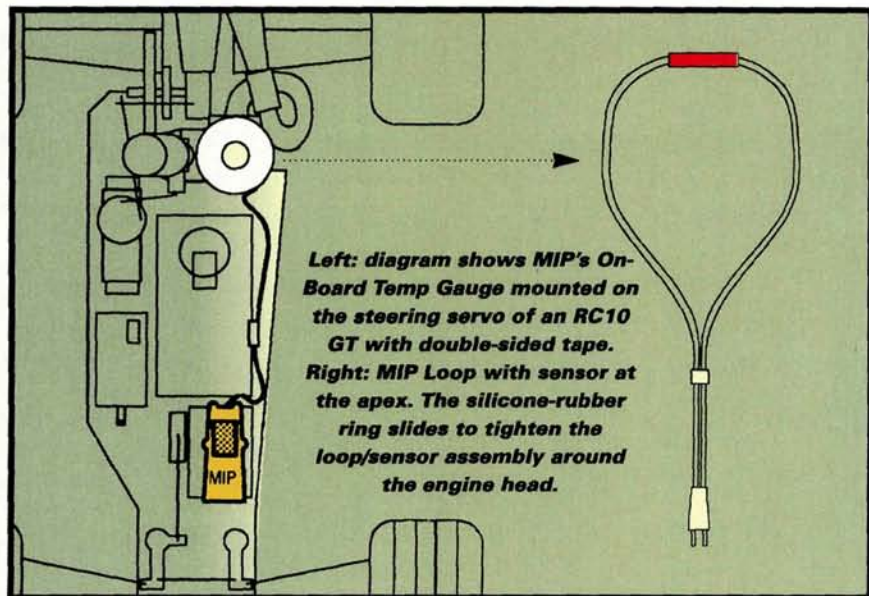
If you have any info, I would appreciate a response.

Thanks for your time.
 [email]
 "Frustrated" Brian

It isn't accurate to compare the temperature readings of heads with different designs in this fashion. The only fair way to do that is to measure exhaust temperature. O'Donnell has an excellent reputation and does not need to mislead anyone; Brian, I wouldn't say this if I didn't really believe it.

Mounted on a specific engine with the same head, the MIP temp gauge is a great little unit for making relative temperature comparisons when tuning that particular engine/head setup.

There are drastic physical differences between the O'Donnell head (a far superior design, in my opinion) and a stock O.S. CV head. As a result, the temp sensor of the MIP unit ends up much closer



Left: diagram shows MIP's On-Board Temp Gauge mounted on the steering servo of an RC10 GT with double-sided tape. Right: MIP Loop with sensor at the apex. The silicone-rubber ring slides to tighten the loop/sensor assembly around the engine head.

A BIT OF PROOF FROM RON

Thanks for answering my letter in "Piston Power" (June 1998). Just wanted to let you know that you hit the nail on the head. The two nice-running engines use tuned mufflers. The two dogs use those contraptions you hate so much. I knew tuned pipes helped performance, but I never realized it was such a night and day difference, or that it made such a difference in engine temp. Looks like I'll be ordering some tuned pipes!

Once again, many thanks for the help. I was ready to dump the Kyosho engines and replace them with O.S., when all I really needed

were a couple of pipes!
[email]
Ron

I published Ron's thank-you email not to prove that I'm "Mr. Correcto Man," but to drive home two points: first, you guys should never even start your engines with those horrid little expansion-chamber/extension-tube contraptions attached; and second, manufacturers should stop including them in their kits and give you guys something better!—that being a tuned pipe or a tuned muffler that will make your engine run stronger and cooler and help it last longer.

Thanks for the thanks,
Ron.

A SLIDE GIVES A SMOOTH RIDE

I have an RC10GT and am thinking about buying an HPI Nitro RS4 Racer. Both were designed for a barrel-carb engine, yet I see that there is a slide-valve carb available for the CZ-Z and CV. Would you give a detailed explanation how to convert the barrel-carb linkage on, say, an RC10GT to a slide-valve linkage? I was thinking of putting an HPI NitroStar .15 CS in the Nitro RS4 racer, and it has a slide valve.

This information would be useful to anyone who is setting up a slide-valve linkage and also to those who are used to setting up a barrel-carb linkage and want

to install a slide-valve carb on their engine.

This is one way that *R/C Car Action* can meet the needs of its readers!
[email]

James Dean Cory, D.C.

James Dean! You're 100-percent right on both counts, and you've given me a great idea for a future column! In my humble opinion, slide carbs are superior. They give the smooth, linear mid-range throttle response that's so important for positive control while cornering. I'll probably get into big trouble for this one, but here goes: barrel carbs are a manufacturing carryover from airplane engines. I'd love to see more .12-size

engines with slide-valve units instead of barrel units.

You're also right about us at *R/C Car Action* wanting to meet the needs of our readers, and the best way we can do that is if you guys tell us what you want. Keep tuned to "Piston Power" for the "detailed explanation" you ask for. I'm working on it!

So, all you guys out there, follow Jimmy Dean's lead and talk to me by snail mail (Air Age Publishing, 100 East Ridge, Ridgefield, CT 06877) or email (chrisc@airage.com). ■



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(Mc Laren F1 GTR shown below)



Radio Control
CAR ACTION 1998
truck
of the year



One trick truck!

PHOTOS BY WALTER SIDAS

Associated **T3**

by the staff of
RADIO CONTROL CAR ACTION



Choosing this year's "Truck of the Year" was, by far, one of the toughest tasks the *R/C Car Action* editors have ever had to face. In the end, we chose the Team Associated RC10T3. The T3 is the result of nearly a decade of R&D; it's extremely popular with "Saturday night" club racers; and it just happens to be *your* favorite truck, according to the results of our '98 Readers' Choice Awards. These are only a few of the reasons why we chose the T3 as the *R/C Car Action* 1998 Truck of the Year.

ELIGIBILITY CRITERIA

To be eligible to win, the candidates had to have been released for sale no earlier than January 1, 1997 and no later than February 1, 1998. To make our choice, we focused on finding the truck that, through performance, outstanding innovation or creativity, and customer loyalty has made its mark in the highly competitive R/C marketplace. It's also important to know that the *R/C Car Action* Truck of the Year Award is not limited to off-road racing trucks, and the winner is not always the truck that has won the most trophies. All trucks—monster, RTR, 4WD and on-road—are considered for the award. In short, if it has a tailgate and was released during the previously mentioned cutoff dates, it was in the running.

s p e c s

SCALE 1/10
LIST PRICE \$340

DIMENSIONS

Wheelbase 11.5 to 11.375 in.
Width (F/R) 12.5/12.5 in.

WEIGHT

Gross, as tested 3 lb., 13.25 oz.

CHASSIS

Type Molded semi-tub
Material Graphite reinforced plastic w/aluminum front and rear plates

DRIVE TRAIN

Type Gearbox
Primary Pinion/spur gear
Transmission Sealed 3-gear
Differential(s) Ball
Slipper Clutch Single pad friction
Bearings/bushings Bearings

SUSPENSION (F/R)

Type Lower A-arm w/adj. upper link
Damping Hard-anodized Teflon-coated Team shocks

WHEELS (F/R)

Type One-piece plastic
Dimensions (DxW) 2.2x2 in.

TIRES

Front Pro-Line The Edge ribbed truck tires
Rear Pro-Line Bowtie



Inside the RC10T3

With the introduction of the RC10T3, Associated has standardized most of its off-road product line; both the T3 and the RC10B3 2WD buggy share many features. Because many racers compete in both the Buggy and Truck classes, it makes sense to race two vehicles that share many parts. This is great not only for racers but also for hobby shop owners, who don't have to stock as many replacement parts. Other than the fact that they share many features, the T3 and the B3 are two completely separate animals that require different driving methods. Here's a quick look at the T3's hot racing features.

• **Molded chassis.** The T3's chassis is nearly identical to that of the B3, except it's significantly longer. It features raised sides for better ground clearance in corners and will accept 6- or 7-cell, side-by-side battery packs. The battery holder allows the tuner to move the cells forward or backward to adjust weight distribution, and an easy-to-use, molded battery strap holds the battery pack securely in place. One of our favorite chassis

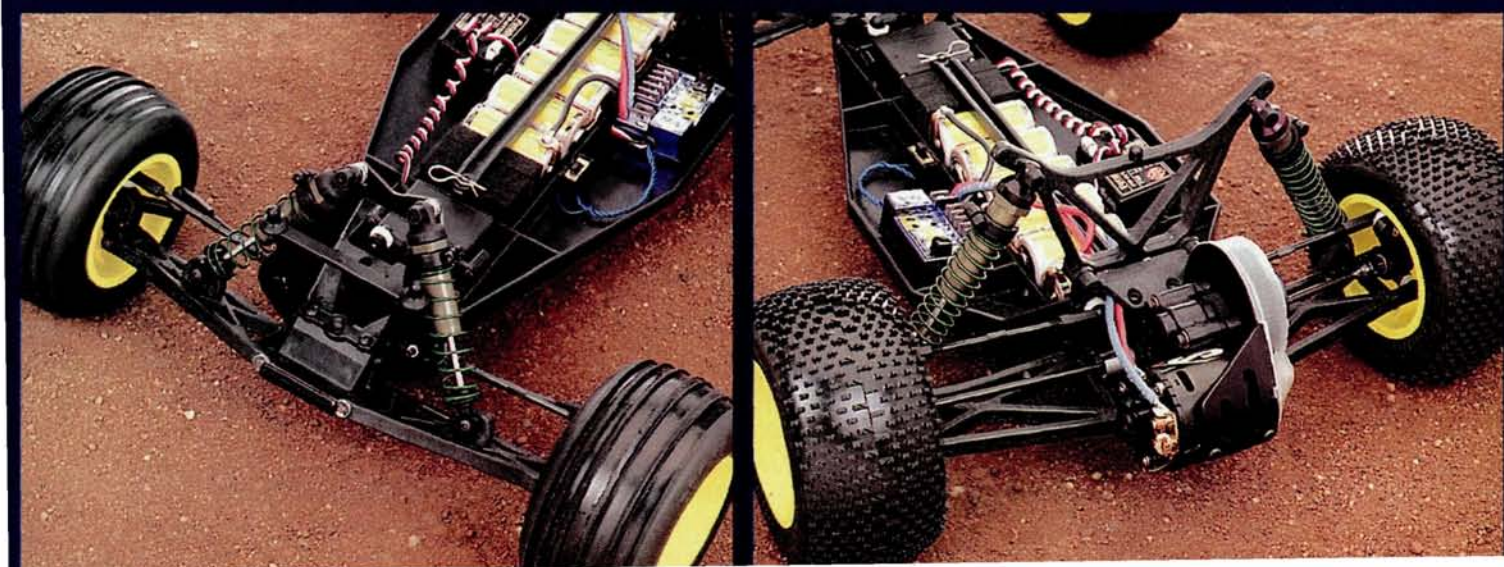
features is the molded channel that allows the builder to route the ESC wires under the battery pack where they will not be harmed by the constant removal and replacement of batteries.

• **Newly designed Stealth tranny.** This is the same tranny that's found on the B3 buggy. It features the same low, 2.4:1 final gear ratio and the newly designed slipper clutch that offers better performance with fewer parts. The new slipper clutch design transfers more torque to the wheels because its slipper pad has a 15-percent-larger diameter. According to Associated, the T3's tranny is smoother, provides more usable torque and requires less maintenance than the previous version.

• **All new suspension and steering geometry.** New caster blocks feature a kingpin camber link that eliminates one of the suspension joints, which in turn tightens tolerances and makes camber adjustment a little easier. This also provides a camber link that's slightly farther outward, which improves steering and makes the truck feel less

Below: narrow chassis front allows for longer suspension arms while maintaining the same wheel track. Associated's excellent hard-anodized shocks are some of the smoothest dampers in the biz.

Below right: Associated's proven Stealth tranny is used in the T3 while longer suspension arms are found as in front. MIP's CVD half shafts are included.



Looking Back

The RC10T

The T3's roots can be traced to the summer of '92, when the first RC10T was introduced; it was the first long-suspension-arm, big-tire racing truck to leave the Associated factory. The RC10T was a tremendous hit with racers around the country (at the time, truck racing was just becoming popular). The 10T underwent many changes and improvements throughout its racing career, and after extensive testing and racing, many of these improvements were incorporated into the design of the truck and later offered in various kits. Entry-level kits equipped with bushings, resistor-type speed controls and stock motors started to hit hobby shop shelves, and the 10T became popular with R/C enthusiasts and backyard bashers alike.



RC10T2

In the spring of '95, Associated released its next-generation racing truck, appropriately named the RC10T2. The new truck was loaded with racing features that were a direct result of years of racing the 10T. Although the T2 featured an aluminum tub chassis that was



similar to the 10T's, the truck was almost entirely new from the ground up. The T2 featured longer sus-

pension arms and rigid suspension components that improved the truck's handling and prowess on bumpy tracks. The truck's Stealth tranny also underwent some significant design changes. Features such as these made the T2 a popular choice and helped develop a huge base of loyal customers for Associated.



"snappy." Steering is further improved with the use of new, more rigid steering arms that provide a full 45 degrees of inside wheel travel. The steering arms are longer, and this allows the steering bellcranks to use their full throw for an improved ratio of movement between the steering arms and the steering servo.

• **Adjustable wheel-base and new hub carriers.** Subtle changes in the truck's overall wheelbase can easily be made by

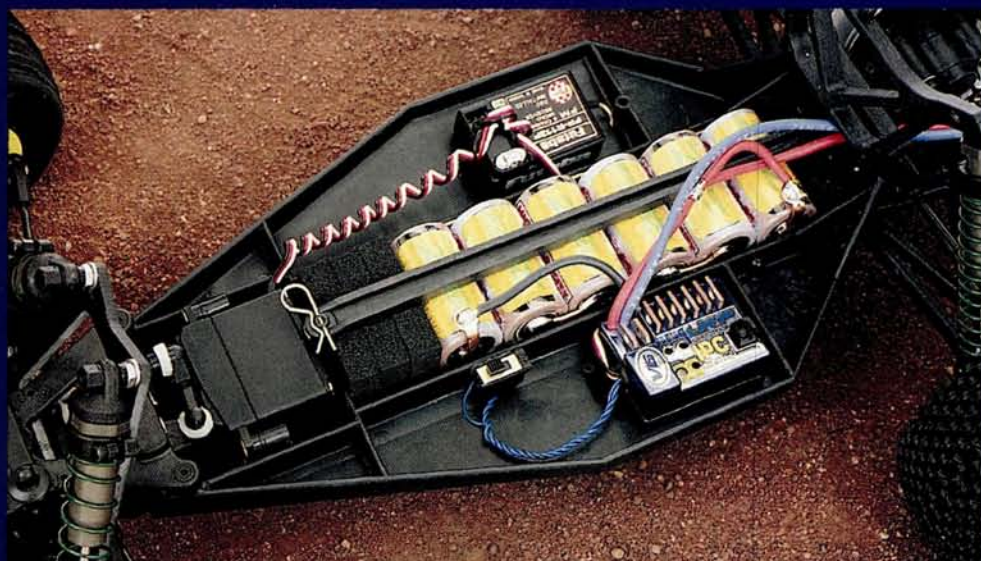
repositioning the spacers on the hinge pins that secure the T3's newly designed rear hub carriers. The new hub carriers feature additional holes for mounting the upper camber link for added flexibility.

• **New rear shocks.** To increase the shock's extended travel, or to allow the shock shaft to completely enter the shock body without hitting the shock cap, new, longer rear shock bodies have been used; 1.39-inch units replace the older, 1.32-inch shock bodies.

• **Real racing rubber.** Pro-Line off-road racing tires are included with every T3. Pro-Line's The Edge front tires and Bowtie rears are high-quality tires that work well on hard-packed dirt tracks.

• **Adjustable rear toe and anti-squat.** New suspension arm mounts give the T3 three degrees of toe-in and three degrees of anti-squat. Various mounts are available through Associated, and this allows the tuner a choice of toe-in and anti-squat settings.

• **Longer suspension arms.** New, longer suspension arms improve the truck's performance when raced in bumpy, rutty conditions. Associated constantly experiments with different composites, and the material used on the T3's suspension arms is lightweight, rigid and strong. ■



Left: the new molded composite tub-chassis features an easy access battery holder. The four sponge spacers (three in front and one at rear of battery) allow for battery weight distribution adjustments.

thrash TEST

1/10 scale gas



OFNA Z10 Pro Nitro

by Greg Vogel

Bench racing is a favorite pastime among R/C racers, and gloating is a form of bench racing that we're all guilty of. We're proud of our machines and of all the time, effort and money that go into them, so when we show off our cars to every driver within a five-pit-table radius, we like the ooohs and aaahs that usually follow.

Well, OFNA* is a company that believes racers should get a lot of ooohs and aaahs for their money, and their new Nitro Z10 Pro and Semi Pro 1/10-scale, nitro-powered touring cars are prime examples. The Nitro Z10 Semi Pro comes with a long list of racing features that are normally expensive upgrades on comparably priced kits. The Pro version (the subject of this "Thrash Test") includes even more racing features, while remaining affordable. Of course, an impressive list of features means nothing if the car doesn't perform well on the track. If you're wondering if the Nitro Z10 Pro performs as good as it looks, read on.

PHOTOS BY WALTER SIDAS

Thoroughbred nitro sedan

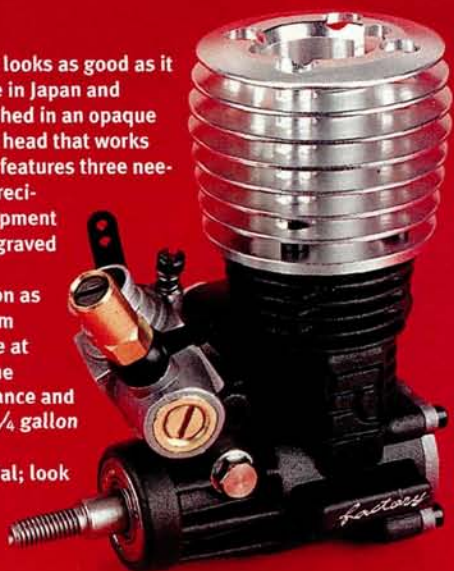


Fly with a Force Pro .12S

OFNA's Force Pro .12S is an impressive engine that looks as good as it performs. The lightweight mill was taken by Active in Japan and revamped to a .65hp nitro-burner. The body is finished in an opaque gray-black body with a bright aluminum heat-sink head that works well with an O.S. no. 8 plug. The barrel carburetor features three needle valve adjustments, and inside you will find a precision three-port sleeve. A boost bottle is stock equipment with the engine, along with a factory signature engraved in the case.

How does it perform? The engine started as soon as the flywheel hit the starter, and it ran perfectly from that point on. The factory needle adjustments were at the perfect settings for the initial break-in. After the engine had been broken in, I leaned it for performance and the car was flying. During testing, I went through $\frac{1}{4}$ gallon of fuel, and the engine was trouble free.

This engine shows signs of serious race potential; look for it in the winners' circle at your track. Who knows? You may be looking at your own engine.



The Nitro Z10 is a pure competition race sedan. It is equipped with graphite components such as the shock towers, upper-deck supports and even the brake disk. The front- and rear-suspension parts are the same as the electric Z10's—also a high-performance race vehicle.



s p e c s

Scale 1/10
List Price \$ 499.95

DIMENSIONS

Length overall 14.5 in.
Wheelbase 10.28 in.
Width (F/R) 7.5 in.

WEIGHT

Gross (as tested) 55.75 oz.

CHASSIS

Type Tapered edge plate w/upper deck
Material Aluminum (lower)/graphite (upper)

DRIVE TRAIN

Type Belt-driven 4WD
Primary 2-speed clutch bell/spur gear
Transmission Universal drive shafts
Differential (F/R) Ball
Slipper clutch None
Bearings/bushings Rubber-sealed ball bearings

SUSPENSION (F/R)

Type Lower arm w/adjustable upper link
Damping Aluminum-body, coil-over, oil-filled shocks

WHEELS (F/R)

Type: One-piece plastic
Dimensions (DxW) 2x1 in.

TIRES

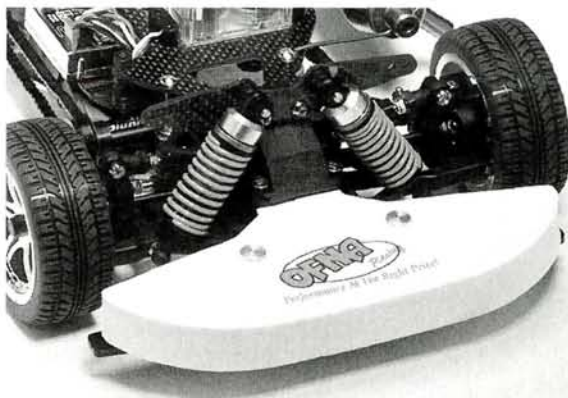
Front/Rear Treaded radials

POWERPLANT

Engine Optional Force Pro .12S
Carb Barrel
Pipe Muffler

KIT FEATURES

• **Chassis.** The Nitro Z10 Pro comes with a gold-anodized aluminum chassis with raised sides that increase its rigidity and countersunk screw holes that allow you to slam the car down low without worrying about the screw heads scraping the track surface. This is actually the same chassis that's found on the Semi Pro version, and there's no need for upgrading in this department. A trick-looking woven graphite upper radio plate replaces the aluminum plate found on the Semi Pro version. The graphite plate is stronger and lighter and gives the car that "factory" look. The upper radio plate has plenty of room for mounting your electronics, and a very user-friendly receiver battery holder is included. The twin bell-crank steering system includes a spring-loaded servo saver, and adjustable tie rods are included for the steering links and upper camber links to facilitate toe-in/out and camber adjustment. A rear graphite chassis stiffener is also included to stiffen up the chassis even more.



Above: hidden behind the large front bumper and bulkhead lies a ball differential that transfers the power to the universal drive shafts. Up front, you'll also notice high-volume, hard-anodized shocks. **Right:** the metal bars with the ball and cup are torsion bars that are supplied with the kit to reduce chassis roll. The large wings on the shock towers are for the body mounts (the mounts were removed for the photo).

Here you see the installed Force .12 Pro engine with OFNA pipe coupler and manifold. I opted not to use the boost bottle supplied with the engine. I used the supplied pressure tap from the boost bottle on the pipe to pressurize the tank. An MIP temperature gauge hidden in the back monitors the temperature.

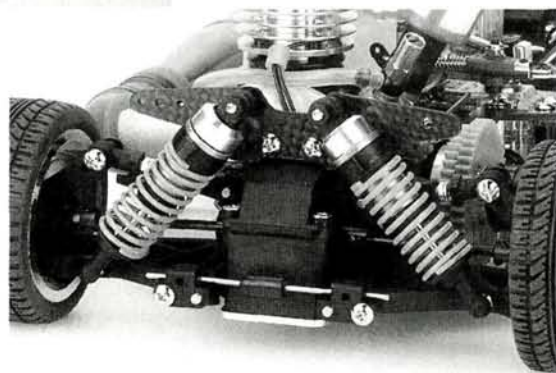
• **Suspension.** The first items to build are the shocks. The gray shock bodies are hard-anodized for smooth, long-lasting performance and are optional on the Semi Pro version. Several optional pistons and clip-on pre-load spacers are also provided, along with red, powder-coated tuned springs.

The suspension arms are installed on the bulkheads with hinge pins that do not require E-clips. Instead, setscrews secure the hinge pins. The two, extra-long, inner lower pins act as mounting points for the included 2-piece front and rear swaybars. The hubs support the universal swing shafts and are supported by high-quality NMB rubber-sealed ball bearings. The shock towers on the Pro are graphite, unlike the Semi Pro's fiberglass units.

• **Drive train.** Like the Semi Pro version, the Z10 Pro includes front and rear ball differentials. These diffs are very conventional in design and work quite well. The only time-consuming part about building the diffs is gluing the retaining plate onto the pulley. The diffs are housed between the gearbox halves and like the rest of the car, they spin on sealed ball bearings.

The center belt is routed along the outside of the car, instead of down the center as on many other designs. This makes maintenance much easier, since the belt is not buried in the car; at the same time, this actually improves weight distribution. A bearing-equipped automatic belt tensioner is also provided to keep belt tension perfect at all times. Also included with the Pro is a servo-actuated disk-brake system with a really trick graphite brake disk pad; way to go, OFNA!

• **Test equipment.** I decided to equip our Nitro Z10 Pro with a pair of high-speed/high-torque servos from Cirrus. A CS-80 high-torque unit controls the steering, while a CS-60 high-speed number, fitted with the stock OFNA



likes

- Packed with hop-ups.
- Ball diffs.
- Full set of bearings.

- Universals.
- Hard-coated shocks.
- 2-speed tranny.
- Excellent race potential.
- Awesome clutch.

- No mount for tuned pipe.
- Shock's O-ring retainer is difficult to snap in place.

dislikes

BUILDING & SETUP TIPS

I modified the 5-cell 600mAh battery pack by removing one of the cells, then mounted

it on the provided battery-mounting plate. I could have easily purchased a 4-cell pack, but I was in a hurry. I then lowered the battery-mounting plate as low on the chassis as possible by installing spacers on the mounting screws. Team Losi shock bushings just happened to be the right size. Instead of mounting the receiver on the supplied plate in the center of the chassis, I mounted it above the battery, as per OFNA factory driver Tim Bump's recommendations. The alternate battery and receiver mounting location lowers the car's center of gravity (CG) and provides more room for mounting receivers of varying sizes.

■ Use sandpaper to take off the sharp edges on the graphite parts. Graphite splinters can really hurt.

■ RCPS works well on the shocks' O-rings to smoothen the dampers.

■ Be careful when threading the setscrews that hold the hinge pins; the soft material can strip if the screws are over-tightened.

■ Use liquid thread-lock on all machine screws that thread into metal. Vibrations from the engine may loosen these screws.

■ Take your time when building the car; read the instructions thoroughly. The supplied instructions are great but you don't want to overlook any steps.

YOU'LL NEED

- 2-channel radio system.
- Engine.
- Starter box (for non-pull-start engines).
- Fuel.
- Glow igniter.
- Paint and basic modeling tools.
- Body.
- Receiver battery pack.

FACTORY OPTIONS

Three-chamber pipe—part no. 32900.
Manifold—37935.
Manifold joint—10183.
Hex drives—37916.
Color springs—39918.
CNC steering—37922.
CNC hub carriers—37923.
CNC rear uprights—37924.
CNC rear arms—37926.
CNC front arms—37925.

servo horn, performs the throttle and brake chores. A Novak* Mercury receiver grabs hold of the signals, while a DuraTrax* 5-cell battery pack powers the radio system. I used a Futaba* 3PDF radio to pilot the car.

Like most other nitro-powered touring cars in this price range, the Nitro Z10 Pro does not include an engine or a body. It does, however, include one of OFNA's new Power Clutch units that uses large balls instead of clutch shoes and can be adjusted without disassembly. This is a really great feature that is an expensive option on other vehicles. The Pro also includes a side-mount, airplane-type muffler with extension tube, just in case.

I decided to fill the empty space on the chassis with one of OFNA's new high-performance Force Pro .12 engines. An MIP temperature gauge keeps an eye on engine temperature. Instead of using the supplied muffler, I opted to go with an OFNA tuned pipe, manifold and coupler. A 75cc fuel tank with priming bulb and

on the race circuit, so onto the car it went.

PERFORMANCE

Dedicated readers may know that we test many of our off-road vehicles at R/C Madness in Enfield, CT. Now, Madness is also our official test site for touring cars (well, *one* of our test sites, anyway; we can't speak for the G-Man; he lives in Southern California). The newly paved parking lot provides an excellent track surface, and owner Chris Marcy always sets up a challenging course.

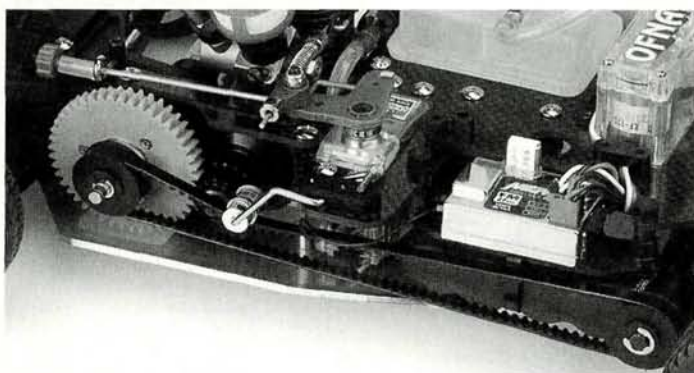
I went out to practice with the Nitro Z10 Pro and found myself quickly changing the tires from the stock meats to a full set of Ride belted slicks that I had mounted on a new set of OFNA 5-spoke chrome rims. The stock meats work well on open parking lots and street corners, but on an enclosed roadcourse, the car pushed through the turns. The Ride* tires kept the car firmly planted through the corners, yet allowed me to slide the rear

around when necessary. The stock suspension setup with the oil and springs worked well. I did adjust the front and rear ride height to approximately $\frac{3}{8}$ inch, though.

The Z10 accelerates quickly and reaches blistering top speeds when the high gear kicks in. If there is one thing this car can do better than squirt down the straight or slide through a corner, it is stop on a dime. The graphite

pad provides excellent stopping power. The only problem I encountered was with the rear hinge pins that go through the suspension arms and hubs. They kept sliding out because I ended up stripping the setscrew holes. However, OFNA's new instruction manuals suggest filing a slot in the center of the pin for the setscrew to rest against. Newer kits will have these keyway slots pre-ground. Just remember, these screws do not need to be over-tightened.

You may wonder how long the 4-cell
(Continued on page 208)



Conventional cars use a long belt in the front; the Z10 uses a long center belt with a short front and a rear belt. Notice the placement of the battery: the 4-cell battery was lowered on the chassis and the receiver was placed on top, instead of burying it in the center of the chassis.

quick-fill cap provides long-lasting runs, while an optional OFNA fuel filter keeps any stray debris from entering the carburetor.

• **Body and tires.** The Nitro Z10 Pro comes with radial tires and multispoke rims. With OFNA's recent unveiling of their new wheel line, however, I opted to install some cool chrome hoops instead. Topping off the tourer is an Andy's Stratus body, which is also available through OFNA. This is one of the hottest bodies

THE COMPETITION

	OFNA Nitro Z-10 PRO	OFNA Nitro SEMI-PRO	HPI Nitro RS4 RACER	FSR Nitro BULLET V-12	Mugen PRIME 12
Wheelbase	10.28 in.	10.28 in.	10.25 in.	10.25 in.	10.25 in.
Width (F/R)	7.5 in.	7.5 in.	7.5/7.75 in.	7.5 in.	7.5 in.
Weight	49.4 oz.	49.1 oz.	51 oz.	50.7 oz.	58.5 oz.
Diff type	Ball	Ball	Bevel Gear	Ball	Bevel gear
Brakes	Graphite	Composite	Fiber	Graphite	Composite
Exhaust	Muffler	Muffler	Muffler	Tuned Pipe	Muffler
List price	\$499.95	\$359.95	\$329	NA	\$355.99
Available at*	\$325.99	\$237.99	\$217	NA	\$219.99
Reviewed in	8/98	—	8/98	—	7/98

*Prices vary with location

Kyosho Repsol Ford Escort

by Jim Napier

WITH THE INCREDIBLE popularity of touring cars, it's no surprise to find companies such as Kyosho pushing the envelope into the dirt. Some bold R/C'ers have already experienced the thrill of rally by converting old touring cars to off-road monsters, but why punish a refined street car? Enter the Kyosho* Repsol Ford Escort RS—a car designed for rallies, straight out of the box.

The Repsol Escort kit is one of the pre-assembled (in this case, 80-percent assembled) EP Series electric cars from Kyosho. Kyosho also offers a gas version (GP) of this car, and an 1/8-scale gas Landmax (featured in the April, 1998,

issue of R/C Car Action), but for those of us who prefer the clean, quiet efficiency of electric, this is our kit.

The Repsol kit comes with a 3-step forward plus reverse mechanical speed control and a Mabuchi 540 stock motor. All that's needed to get the car up and running are a radio with two servos and a battery pack. Since the kit comes mostly assembled, you won't have to wait long to take your first spin.

This car is definitely aimed at the entry-level racer or backyard basher, rather than at someone who is looking to start a serious rally-racing career. If you're





All-terrain tourer

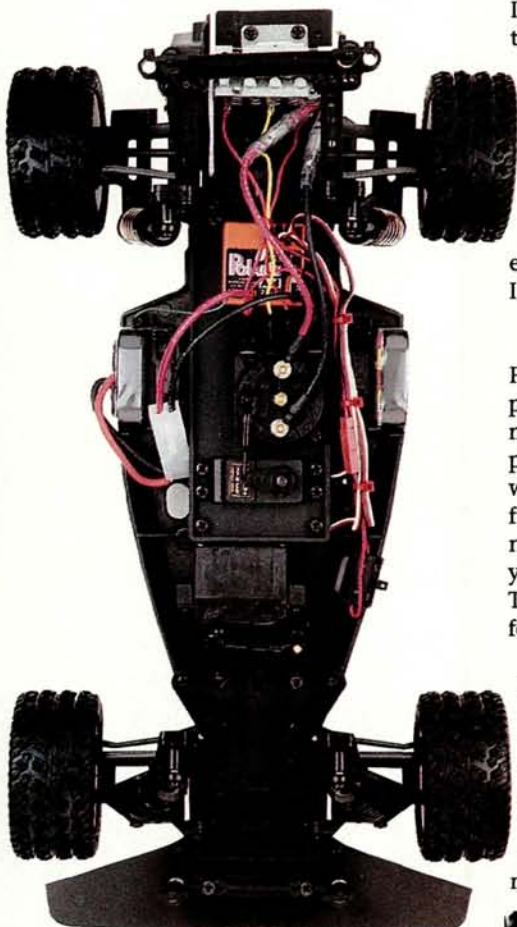


like me, though, you'll be pleased to know that such a kit exists at a reasonable price; I don't particularly care to convert one of my expensive racing sedans to a rally car. The kit's sound design owes more to off-road buggy technology than to its street brother, the sedan, and it has been well assembled. A molded-plastic tub chassis houses all the gear, and beefy oil-filled, coil-over shocks damp the road at all four corners. There's a fair amount of ground clearance here, too; you won't need to seek out the smoothest, tamest dirt you can find because this kit is ready for some serious rallying!

s p e c s

SCALE 1/10
LIST PRICE \$169.99
Available at \$129.99

DIMENSIONS
Length overall 18.5 in.
Wheelbase 11 in.
Width (F/R) 7.2/7.2 in.
Height 6.7 in.



WEIGHT
Gross, RTR 3 lb., 15.25 oz.

CHASSIS
Type Tub
Material Composite nylon

DRIVE TRAIN
Type Gearbox
Primary Pinion/spur
Transmission Dogbone
Differential(s) Gear
Slipper clutch None
Bearings/bushings Bushings

SUSPENSION (F/R)
Type Double wishbone
Damping Oil-filled, coil-over

WHEELS (F/R)
Type (F/R) One-piece plastic
Dimensions (DxW) 1.4 x 2 in.

TIRES
Front/rear Rally block

ELECTRICS USED IN TEST
Motor 540 type
Battery Trinity Thundersport
ESC 3-step mechanical
Radio Futaba Magnum Sport
Receiver Novak Polaris



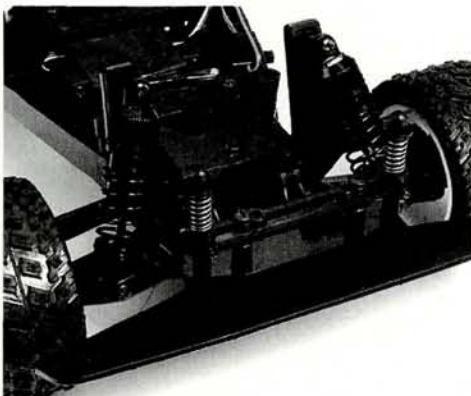
ASSEMBLY

For the remaining 20 percent of assembly, all I had to do was build the shocks and install the body posts, servos, receiver and speed control—not too much to handle in an hour or two. I did have a problem sealing two of the shocks but, other than that, they were a breeze to assemble. On a positive note, Kyosho provides a heavier spring for the rear shocks, which have to take more of the weight, and this is nice for an entry-level kit. The rest of the job was a snap; I was up and running in no time at all.

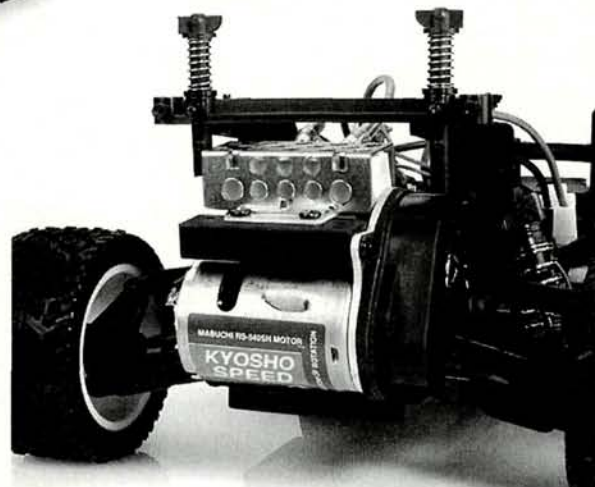
PERFORMANCE

For a quick test, I dropped the Escort onto the parking lot outside my front door. The pavement is relatively new and provides a great practice surface for my sedans, so I thought I would check my new rally machine there first. I decided to start out slowly; you just never know what evil lurks behind that first yank of the throttle on a newly built R/C car! The mechanical speed control slipped comfortably into first, and I was off.

The car ran smooth and straight, so I kicked it into second and then straight into third. With the car now up to its top speed—which was still pretty slow with the included Mabuchi 540—I twitched the wheel back and forth, then gave it a full turn to the left. The handling seemed smooth and predictable; the car can definitely handle the top speed of the mechani-



Above: a large front bumper protects the suspension components and supports the rally body. Spring-loaded body clamps hold down the body—oh, shucks!; now I won't lose any more body clips. Right: from the back, you see the stock 540 motor and the speed-control heat sink. The suspension components are all of the same quality as those found on the rest of the Kyosho Outrage series.



YOU'LL NEED

- 2-channel radio with 2 servos.
- 6-cell battery with standard connector.
- Charger.
- CA glue.
- Paint.
- Tools (cross-head screwdriver, needle-nose pliers and wire cutters).

FACTORY OPTIONS

- Complete bearing set—part no. DTXC1362.
- Universal swing shaft—KYOC6134.

cal speedo and the Mabuchi motor. Just for kicks, I quickly pulled full reverse on the trigger, and the Escort responded politely, slowing smoothly and then backing up. With another pull on the trigger, I went back to full-speed forward, and I was

Likes

- Very affordable.
- 80-percent pre-assembled.
- Easily adjustable body mounts.

- Shock bodies not cleanly molded.
- Some binding in the suspension.
- Fragile hub carriers.

dislikes

rewarded with one of those cool movie chase-scene 180s. The car shot forward to where it had just been headed in reverse (at this point, I can attest to the durability of Kyosho's mechanical speed control because this move was so much fun that I repeated it until my battery dumped!).

The real test, however, was where rally cars are truly in their element: in the dirt! Because of its 2WD power train, the Escort Rally exhibits much of the same power-sliding, dirt-throwing, wheel-spinning action as is part of full-scale rally racing. The performance and handling are very respectable for an entry-level car, and with the addition of a good stock or mild modified motor, they can only improve.

Jumping ability is always on the mind of an entry-level enthusiast, so the next stop

(Continued on page 197)



Tamiya **TA03F Pro David Jun Limited Edition** by Greg Vogel

David Jun rocked the R/C world when he piloted his TA03F Pro to victory at the NORRCA Road Course Nationals back in '97. But it wasn't until he took the checkered flag at the ROAR On-Road Nationals the following year that racers and other R/C manufacturers started to accept the Tamiya* TA03F Pro as a serious contender in the highly competitive 4WD touring car arena.

Tamiya recently released a limited production replica of the TA03 that David Jun used to capture his NORRCA and ROAR national titles. This new offering is appropriately named the TA03F Pro David Jun Limited Edition, or "DJ Edition," as we'll refer to it from this point on. Average club racers can now own a factory ride that's loaded with many of the optional parts that Dave used to win against a field of top U.S. and Japanese drivers. Does the DJ Edition have what it takes to make you drive like a "Pro"? Read on and find out.

PHOTOS BY WALTER SIDAS

SCALE 1/10
LIST PRICE \$356

DIMENSIONS
Length overall 15³/₈ in.
Wheelbase 10 in.
Width (F/R) 7.13/7.25 in.

WEIGHT
Gross, RTR 53.7 oz.

CHASSIS
Type Double-deck
Material Carbon-fiber

DRIVE TRAIN
Type Belt-driven 4WD
Primary Pinion/spur
Transmission Universal drive
shafts/dogbones
Differential(s) Ball
Bearings/bushings Sealed bearings

SUSPENSION (F/R)
Type Lower arm with upper link
Damping Aluminum, oil-filled,
coil-over shocks

WHEELS (F/R)
Type One piece plastic
Dimensions (DxW) 2x1

TIRES (F/R)
Type Tamiya Type A reinforced slicks

ELECTRICS (not included)
Motor Orion 11x2
Battery Orion V-Max Matched 2000s
ESC Novak Atom

Tamiya's Worlds- winning replica



KIT FEATURES

• **Chassis.** The kit's most striking new feature is its color—black. Tamiya has dyed all of the kit's gray plastic parts black for this special limited edition. Of course, my eyes were immediately drawn to the thick, narrow, upper and lower carbon-fiber chassis plates that enhance the chassis' looks and offer incredible rigidity.

The lower chassis plate has been relieved of excess material to reduce weight without sacrificing strength. To Tamiya's quick-change battery holder I added Tamiya's graphite battery retainer (my first optional addition) so I would be able to use side-by-side racing packs. Unfortunately, the stock battery holder will accept only stick packs. The optional battery retainer is supported by aluminum posts and uses a graphite upper plate that matches the rest of the chassis.

TAMIYA DAVID JUN EDITION



Likes

- Many options usually bought as aftermarket hop-ups are included with the kit.
- Easy to assemble.
- Handles great.

- Some suspension slop.

- Adjustable upper links aren't included.

dislikes

YOU'LL NEED

- 2-channel radio system.
- Electronic speed control.
- Motor.
- Battery and charger.
- Body.
- Paint and tools.
- CA glue.

FACTORY OPTIONS

- Silicone oil set—part no. 53025.
- Carbon battery plate—53261.
- Urethane bumper set—53268.
- Turnbuckle upper arm set—53129.
- Quick-release battery holder—3238.

BUILDING & SETUP TIPS

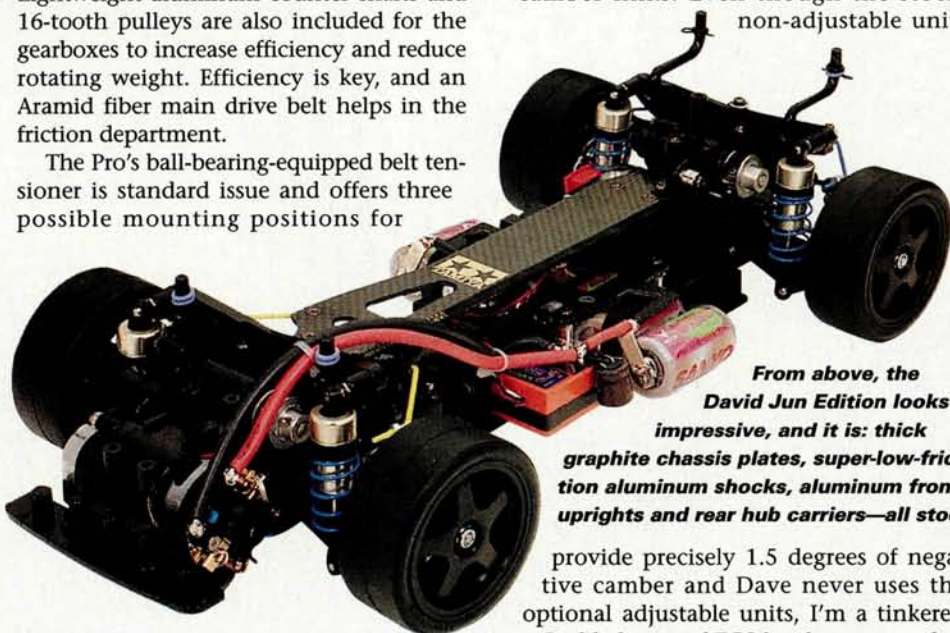
The TA03F Pro David Jun Limited Edition includes many factory hop-ups. A special

instruction booklet takes the car's unique features into consideration. The hop-up parts are inside the numbered bags along with all the other parts, so building the DJ Edition is just like building any other Tamiya kit. Tamiya could easily have added supplementary sheets to the regular TA03F Pro instructions, but instead opted to print an entirely new booklet. Even though the kit is easy to build and comes with excellent instructions, here are just a few hints that will help you keep your car raceworthy.

- Do not over-tighten the wheel nuts. It will cause drag or binding in the drive train.
- Glue the tires to the rims with CA. I know this sounds basic, but I spend a lot of time at the track, and I always see tires flying off rims.
- After every run, check for debris in the drive pulleys.
- Use RCPS* green slime on the O-rings in the shocks for extra-smooth performance.
- Sand the chassis edges to remove sharp edges, and apply CA to help prevent delamination.
- Keep a selection of Tamiya tuned springs and swaybars handy for further tuning to your track.
- If you use the optional battery retainer as I did, use liquid thread-lock on the screws that go into the aluminum post.

• **Drive train.** You want hop-ups? The DJ Edition includes a treasure chest of genuine Tamiya hop-ups right in the box. The drive train is equipped with front and rear ball differentials with hardened pressure plates for smooth cornering transitions. The front and rear diffs (as well as the rest of the drive train) spin on a complete set of Tamiya's high-quality sealed ball bearings. Lightweight aluminum counter shafts and 16-tooth pulleys are also included for the gearboxes to increase efficiency and reduce rotating weight. Efficiency is key, and an Aramid fiber main drive belt helps in the friction department.

The Pro's ball-bearing-equipped belt tensioner is standard issue and offers three possible mounting positions for



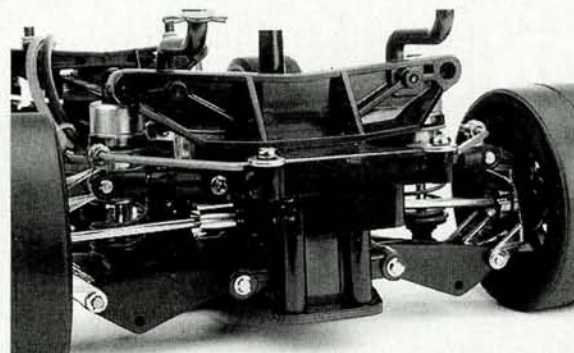
From above, the David Jun Edition looks impressive, and it is: thick

graphite chassis plates, super-low-friction aluminum shocks, aluminum front uprights and rear hub carriers—all stock.

provide precisely 1.5 degrees of negative camber and Dave never uses the optional adjustable units, I'm a tinkerer, so I added a set of TCS-legal upper camber links (my only other hop-up).

TEST GEAR

I bolted a Team Orion* 11-turn double motor onto the included optional aluminum motor heat sink.



In the rear, the composite hubs found on the regular TA03 have been replaced by aluminum hubs for increased rigidity.

• **Suspension.** Up front, the plastic uprights have been replaced with trick machined aluminum-alloy units that reduce caster from 8 to 5 degrees for increased turn-in steering. In the rear, another set of aluminum uprights provides additional support to the rear axle assembly. In addition, stainless-steel suspension shafts (hinge pins) are used throughout, as are lightweight aluminum ball connectors.

Tamiya's optional Super-Low Friction Aluminum Dampers are standard equipment on the DJ Edition, and they include

THE COMPETITION

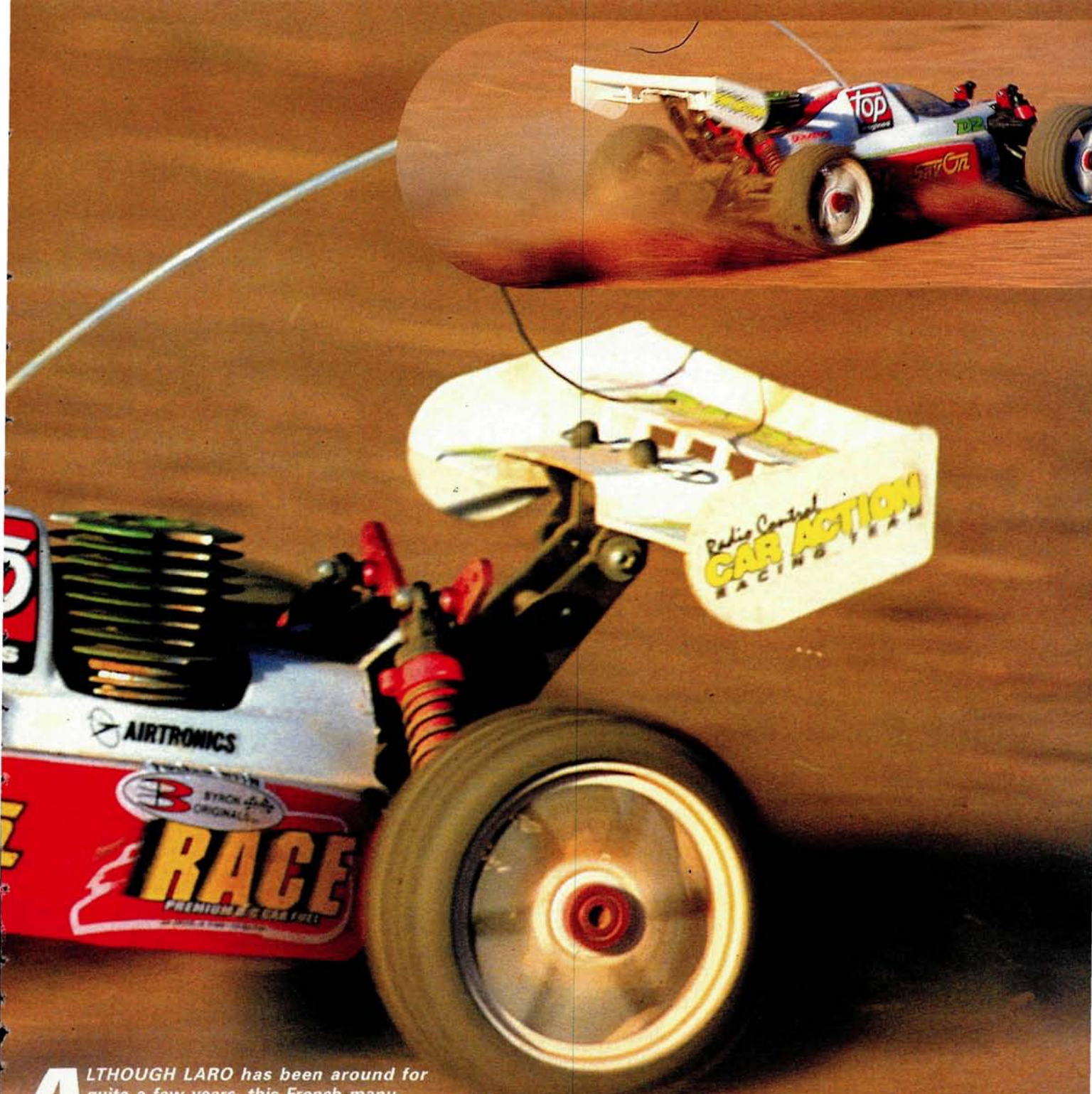
	Kyosho TF-3R	HPI RS4-PRO	Tamiya TA03F PRO	Schumacher SST 2000'98	OFNA Z10
Wheelbase	10.3 in.	10 in.	10.1 in.	10 in.	10.15 in.
Width (F/R)	7.75 in.	7.25/7.125 in.	7.19 in.	7.25 in.	7.48 in.
Weight	3 lb., 5 oz.	2 lb., 8 oz.	3 lb., 8.7 oz.	3 lb., 2.75 oz.	3 lb., 2.5 oz.
Diff type	Gear	Ball	Ball	Ball	Ball
Chassis	Double deck	Carbon fiber	Graphite	Fiberglass	Graphite
List price	\$259.99	\$399	\$356	\$369	\$379.95
Available at*	\$219.99	\$259.99	\$199.99	\$225	\$215.99
Reviewed in.	1/98	10/97	10/96	12/96	4/98

*Prices vary with location.

Laro **D2 Diabolo**

by Kevin Hetmanski





ALTHOUGH LARO has been around for quite a few years, this French manufacturer's machines are rarely spotted on our side of the pond. All that is about to change, however, now that Savon Hobbies* is importing Laro's 1/8-scale buggies. I was lucky enough to get my hands on the 1/8-scale off-road D2 Diablo—Laro's top car—and I put it through its paces because 1/8 scale is a hotly contested class where I race. The D2 had to be up to snuff! Let's see what this French devil has to offer.

dirt demon

KIT FEATURES

• **Chassis.** The aluminum chassis was one of the first things to catch my eye. At a thickness of 4mm, it rivals the aftermarket units I've seen in other cars. In true racecar fashion, the rigid chassis plate features 8 degrees of front kick-up for optimum handling. The included front brace will prevent the front of the chassis from being folded in a head-on collision. All of the mounting screws that pass through this plate are countersunk to keep the bottom ultra-smooth.

The engine and fuel tank are mounted on the left side of the chassis. Mounted on the right, the one-piece radio tray allows you to pull out all of the radio gear just by removing a few screws. One nice feature is that the receiver battery isn't held in with zip-ties; it's safe and sound in a sealed compartment. Even the receiver has a safe home.

LARO D2 DIABLO



s p e c s

SCALE 1/8
LIST PRICE \$579.99

DIMENSIONS
Length overall 19.69 in.
Wheelbase 12.91 in.
Width (F/R) 9.84 in.

WEIGHT
Gross (as tested) 7.59 lb.

CHASSIS

Type Plate with kick-up
Material Aluminum

DRIVE TRAIN

Type Shaft-driven 4WD
Primary Clutch bell/spur
Transmission (F/R) Universals/dogbone
Differential(s) 3-bevel gear
Clutch 3-shoe
Bearings/bushings Bearings

SUSPENSION

Type (F/R) 4W independent w/lower arms and adjustable upper link
Damping Aluminum, oil-filled, coil-over shocks

WHEELS

Type (F/R) One-piece plastic
Dimensions (DxW) 4.53x1.69 in.

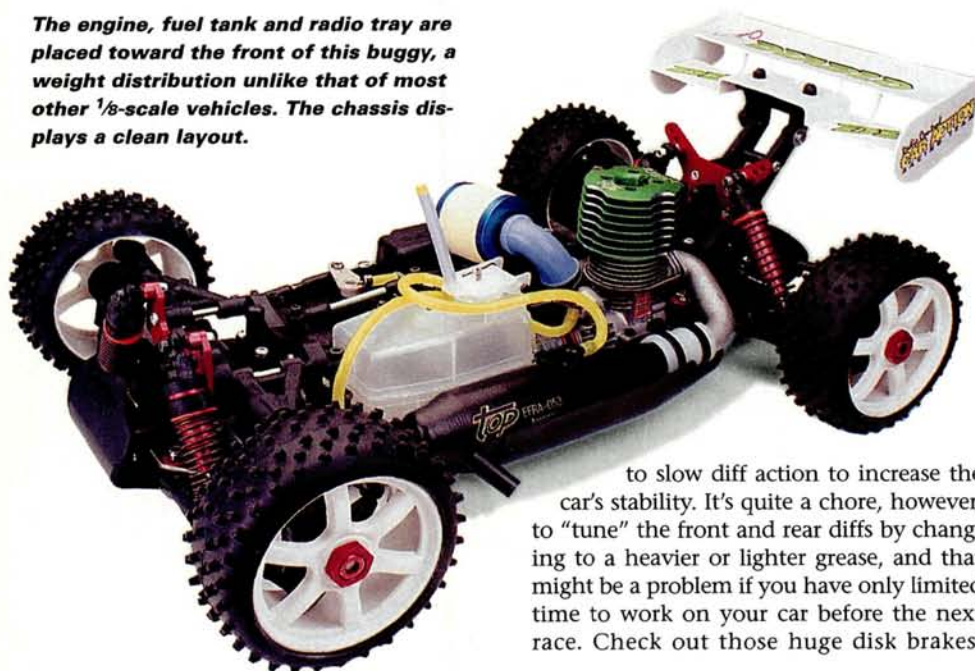
TIRES

Front/Rear Spike

POWERPLANT

Engine Top
Pipe Top
Carburetor Slide

The engine, fuel tank and radio tray are placed toward the front of this buggy, a weight distribution unlike that of most other 1/8-scale vehicles. The chassis displays a clean layout.



• **Suspension.** Can you say "tons of adjustability"? This is one of the most unusual suspension setups I've ever seen. Lower suspension arms usually pivot on a plastic gear case with a hinge pin, which can be a weak point because it can bend or break. A plastic gear case isn't immune to breaking either. The D2's lower suspension arms have very smooth pivot balls mounted on the strong, aluminum chassis instead of on the gear case. You'll find these pivot balls throughout the suspension, with the exception of the front upper suspension arms and on the rear hub carriers.

Another unique feature of the D2 is the adjustable rear toe angle. An adjustable link integrated with the lower rear suspension arms allows an extensive range of toe adjustment. On most kits, you're limited to the suspension blocks that the company provides, and these limit or even eliminate the possibility of adjustment.

The beefy A-arms at all four corners have adjustable bump stops to limit suspension down-travel, and front and rear anti-sway-bars further add to the tuning options. Red-anodized, oil-filled shocks are attached to a pair of heavy-duty shock towers, each of which has three mounting positions. The suspension arms also have three mounting positions for the bottom end of the shocks. Unique C-clips on the upper front hinge pins—in front of or behind the upper suspension arm—allow caster-angle adjustment.

• **Steering.** The steering system includes a spring-type servo saver and two bellcranks connected by a fixed-length rod. On each bellcrank, there are stops to control steering travel. The link that connects the steering bellcranks and the servo is a rather thin piece of wire that I opted to replace with an adjustable titanium link.

• **Drive train.** Bevel-gear differentials control power delivery. The diffs are filled with grease to reduce the wear on the gears and

to slow diff action to increase the car's stability. It's quite a chore, however, to "tune" the front and rear diffs by changing to a heavier or lighter grease, and that might be a problem if you have only limited time to work on your car before the next race. Check out those huge disk brakes!

They could stop my full-size Dodge Ram. One thing that is a little disappointing is that the front and rear brakes can't be adjusted independently.

• **Electronics.** I was a little disappointed that there were no holes in the receiver box or receiver battery box to run the servo wires through; I had to drill them. This complicated radio installation and, to make things even worse, there was no place to mount the switch for the receiver.

• **Fuel tubing.** Installing this takes attention and patience. If you run the tubing along one side of the fuel tank, it will be close enough to the exhaust system to heat the fuel, and that will affect performance and could cause other problems. The other option is to run the fuel tubing down the other side of the tank where it's very close to the center gear. I chose this as the one less likely to end my racing prematurely. Note that the tubing must be properly secured to prevent it from becoming snarled in the gears.

• **Body.** The final stage of assembly; my only gripe here was that I had to spend time trimming the body, since there are no trim lines! Though this job only cost me a little time, trim lines on R/C car bodies are something you just take for granted—until

BUILDING & SETUP TIPS

The Laro is a pure competition race buggy, so take your time building it and be certain to perform regular maintenance checks when you run it.

regular maintenance checks when you run it.

■ **OK;** you know the deal. For smoother performance, we recommend using RCPS green slime lubricant on the shocks' O-rings. And don't forget to use Loctite on any machine screws that go into a metal object.

■ With the adjustable toe link on the lower rear suspension arms, you will need to be sure they are the same length on both sides. If one has more toe than the other, the car will perform erratically.

■ To fit the servo plugs through the receiver's protective box, you'll need to do some drilling and reaming.

■ A prebent wire to mount the tuned pipe is not included, so I made my own using piano wire that I purchased from a local hobby shop. Then I drilled a small pilot hole in the chassis and tapped it with a 4-40 tap. I used a 4-40 screw to hold the wire in place.

■ I glued the stock tires to OFNA* rims because the stock rims didn't have a lip to help secure the tires; I feel better having the extra security.

YOU'LL NEED

- 2-channel radio system.
- Engine.
- Starter box.
- Side-by-side receiver pack.
- Fuel.
- CA glue.
- Glow starter.
- Paint for Lexan.
- Tools for assembly.

LARO D2 DIABLO

they aren't there! I suggest you mark the body roughly before painting to make it easier to trim later.

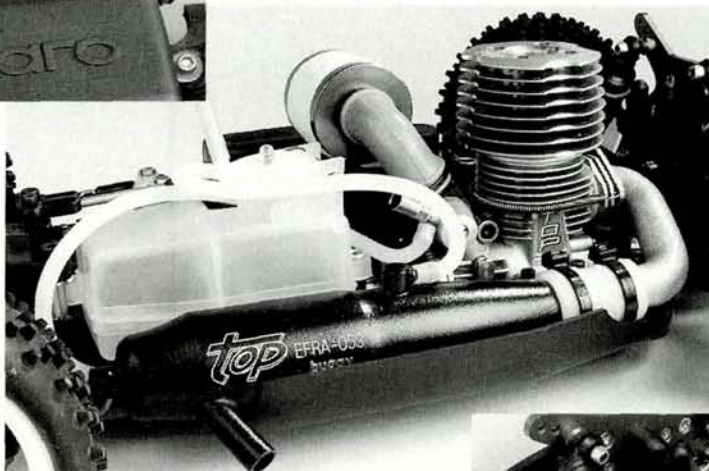
TEST EQUIPMENT

To rocket this car down the track, the guys from Savon Hobbies hooked me up with a 3.5cc Top buggy engine with a header and a tuned pipe. For years, these highly respected engines have been at the top of the trade, but I had never used one. If the quality of workmanship was any indication of the performance, I expected this one to fly!



Above: the center differential uses a two-disk-brake system for stopping power. The brakes are actuated by a single cam.

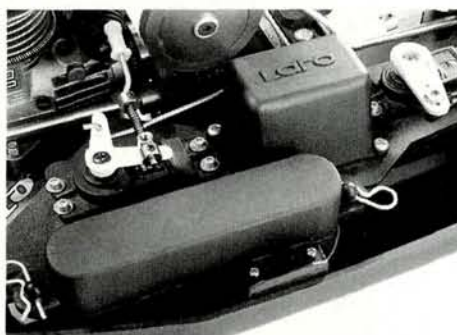
Right: the Top engine is a work of art and one powerful mill. A Top tuned pipe allows the nitro burner to breathe properly.



For controls I used an Airtronics* Caliber 3PS radio with two high-torque, high-speed Airtronics servos, and a Dynamite* 5-cell receiver pack provided the power. I used Byron 20 percent fuel for burn.

PERFORMANCE

The D2 has run well in Europe on smooth,



The Laro radio tray shields the battery and receiver from harmful fuel and debris. The tray is molded from a strong composite material.

After a gentle engine break-in, I leaned out the D2 and attacked the track. Right away, I was amazed at how well it soaked up the bumps. It sits a little low, so its nose stuck in the dirt from time to time, but it was nothing a little shock tuning wouldn't cure.

The next day, I went out to Xtreme R/C in New Milford, CT. I arrived just after the rain had stopped, and there were several puddles, but the track is hard and very smooth. It was made for 1/10-scale cars, so it's also a little tight.

The crazy Xtreme guys broke out the shop vac, and within a half an hour, we were ready to run. The car was at home on this surface, and I rocketed it around much faster than at the previous track. The car showed the familiar 1/8-scale buggy four-wheel-drift action, so it was a lot of fun to drive.

The next day, I headed to R/C Madness in Enfield, CT. The "nutty professor," Chris Marcy, had set up the track for his annual supercross race. This big track has huge jumps and crazy turns with huge berms, and they usually have a huge turnout of 1/8-scale cars.

The low, ground-hugging stance of the D2 had me a little worried that this monster track would swallow it—after all, the supercross race features incredibly huge jumps (large enough, it appeared, to trip up even a full-scale stadium racer).

As soon as the D2 hit the track, my worries were over. It attacked with authority and ran very smoothly through the rhythm section. Boy, can this car jump! In the straightaway, there's a monstrous, very intimidating set of triples. After clearing them successfully a few times, I was like a little kid who discovers there really aren't any monsters under the bed. From every angle, I dared these triples to trip the D2 up, but it resisted everything but a direct attempt to turn it over onto its lid.

As much fun as air time can be, I actually enjoyed driving through the turns most. I mashed the throttle and, with the inherently good handling of a 4WD nitro buggy, ran virtually flat punched through the big banked turns.

FINAL THOUGHTS

Overall, I think that the D2 will be a real contender in the States. It has done very well on the European circuit against some of the best drivers there. As does any car, I feel it needs some subtle improvements to make it more durable and easier to maintain, but it definitely has a strong foundation and will be a car to reckon with. In short, it's rather obvious that I was impressed with the Laro D2 Diablo.

Likes

- Suspension.
- Front swaybar included in kit.
- Full ball bearings.
- Sealed receiver box.
- Ultra-stiff and thick aluminum chassis.

dislikes

- Small opening on fuel tank.
- Plastic center gear.
- The body could be more attractive.
- Front and rear disk brakes can't be adjusted independently.
- Poor accessibility to front and rear diffs.

Here is a close-up shot of the Diablo's unique suspension pivots. The arms snap onto large pivot balls instead of using hinge pins.



grass tracks. Our American dirt tracks are rougher and have more jumps. To give it a fair thrashing, I tested it on three tracks that provided a variety of conditions.

My first stop on the three-day tour was JP's Hobbies in Derby, CT—a very loose dirt track that's pretty bumpy. It's set up for 1/10-scale cars, so it is a little small for one of these screaming devils.

THE COMPETITION

	OFNA Ultra Worlds GT	Mugen Super Athlete	Kyosho MP-5	Kyosho Inferno DX II	Thunder Tiger VSPEC	Laro D2 Diablo
Wheelbase	12.9 in.	12.68 in.	12.625 in.	12.91 in.	12.5 in.	12.91 in.
Width (F/R)	12.12 in.	9.92 in.	11.875 in.	12.01 in.	12.4/12.5 in.	9.84 in.
Weight	7 lb., 8 oz.	7 lb., 4 oz.	7 lb., 2 oz.	6 lb., 8 oz. (net)	7 lb., 12 oz.	7.59 lb.
Diff type	Planetary	Planetary	Miter	Bevel	Planetary	Bevel gear
Brakes	Dual disk	Dual disk	Dual disk	Dual disk	Dual disk	Dual disk
Exhaust	Header and pipe	Tuned pipe	Not included	Header and pipe	Header and pipe	Not included
Price	\$535.95	\$749.99	\$699.99	\$449.99	\$499.99	\$579.99
Available at*	\$329	\$500	\$549.99	\$339.99	\$420.20	\$399.99
Issue reviewed	8/97	7/97	12/95	7/98	9/97	—

*Prices may vary depending on location.

*Addresses are listed alphabetically in the Index of Manufacturers on page 209. ■



HPI Nitro RS4 Racer by Steve Pond

WITH THE introduction of the Nitro RS4 Racer, HPI* has managed to combine the most popular form of on-road racing with the increasingly popular nitro power. It's the latest from the HPI racing stable and is supposed to answer the calls of racers requesting more performance accessories in the kit. Does the "Racer" edition measure up? Read on and find out

Going fast costs money, so you may be asking, "OK; so what does all this extra equipment cost?" It costs you an engine and a body—that's right; an engine and a body! The Nitro RS4 Racer kit includes a host of race-oriented equipment for the same price as the standard edition but it doesn't have an engine and a body—items that many seasoned racers prefer to choose for themselves anyhow.

PHOTOS BY WALTER SIDAS

ASPHALT ANNIHILATOR



THE KIT

• **Chassis.** The double plate chassis' most obvious feature is the bright purple anodizing on the new aluminum lower plate. While it looks pretty awesome, the best of the chassis' features are in the details. The new lower plate is thicker than that of the standard model, providing a more rigid chassis for improved handling. Also, the screw holes in the bottom of the lower plate are countersunk to prevent the screws on its underside from scraping the ground.

At either end of the chassis are heavy-duty bulkheads that, among other things, house the front and rear gear differentials. A standout feature of the rear

bulkhead is the pair of eccentric adjusters for belt tension. Rotating these adjusters moves the diff back and forth to provide nine settings for the rear belt tension. Adjustment can be labor intensive, as it requires almost complete disassembly of the bulkhead, but adjustments are locked in for good (barring a catastrophic and unlikely chain of events).

• **Suspension.** The Racer features the same beefy suspension arms as other versions of the RS4 touring cars. They are exceedingly strong and well up to the task of handling the rigors of nitro racing. All of the lower arms pivot on

solid 3mm steel hinge pins. While these pins are not made of stainless steel or titanium, they are nail-type pins that require only one E-clip to hold them in place (just half the E-clips to worry about vibrating loose). Just above the lower arms are adjustable upper links that feature turnbuckle tie rods to facilitate adjustment.

The suspension's most significant elements are the aluminum-body oil-filled shocks—included with the electric Pro and the Nitro RS4 Racer kit. They feature Teflon pistons and silicone oil for damping, and they seem to be the smoothest, most consistent shocks I've ever seen on an R/C car.



s p e c s

SCALE 1/10
LIST PRICE \$329

DIMENSIONS
Length overall 14.06 in.
Wheelbase 10.08 in.
Width (F/R) 7.5/7.75 in.

WEIGHT
Gross, RTR 51 oz.

CHASSIS
Type Upper and lower plate
Material Lower aluminum/
upper plastic

DRIVE TRAIN
Type Belt
Primary Single-speed clutch
bell/spur
Universals
Transmission Bevel gear
Differential(s) Two-shoe centrifugal
Clutch Sealed ball bearings
Bearings/bushings

SUSPENSION (F/R)
Type Lower A-arm w/adjustable
upper link
Damping Aluminum-body, oil-filled

WHEELS
Type One-piece plastic
Dimensions (DxW) 2x1 in.

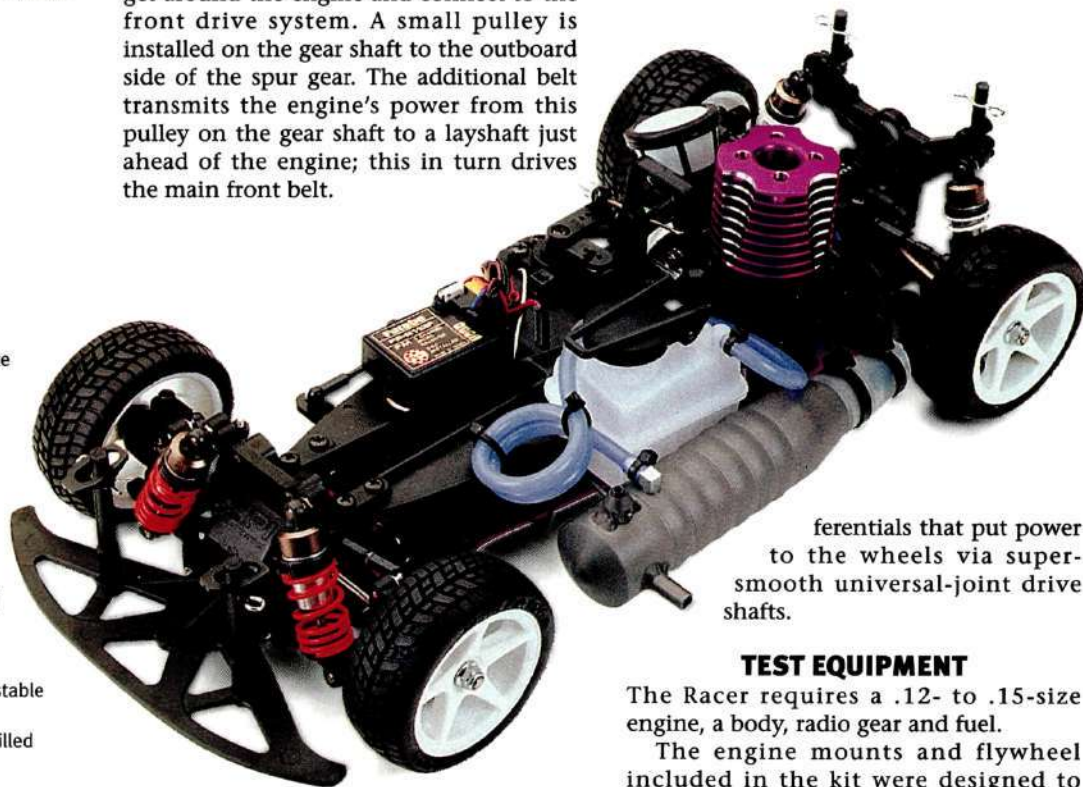
TIRES Super Compound
Super Radial

POWERPLANT (not included)
Engine O.S. .12 CV w/optional
O'Donnell head
Pipe Optional Paris turbo ring
pipe/HPI manifold
Carb Barrel



The optional O.S. engine is equipped with an O'Donnell Racing lightweight cylinder head and Motor Saver air filter.

• **Drive train.** The Nitro RS4 Racer features a lightweight, efficient belt-drive system. Power is delivered through the clutch-bell/spur-gear combination to a gear shaft that drives the front and rear belts. The rear belt runs directly off this shaft, but an additional belt is required to get around the engine and connect to the front drive system. A small pulley is installed on the gear shaft to the outboard side of the spur gear. The additional belt transmits the engine's power from this pulley on the gear shaft to a layshaft just ahead of the engine; this in turn drives the main front belt.



ferentials that put power to the wheels via super-smooth universal-joint drive shafts.

TEST EQUIPMENT

The Racer requires a .12- to .15-size engine, a body, radio gear and fuel.

The engine mounts and flywheel included in the kit were designed to accommodate a pull-start engine (shorter mounts and a smaller flywheel are available for non-pull-start powerplants). Opting for a pull-start engine relieves you of having to buy an expensive, bulky starter. In the name of pure performance, however, I chose a non-pull-start O.S.* .12 CV. This engine is the most popular in racing circles, and by all accounts, it's more reliable and powerful than any engine in its class. The only drawback is its cylinder head, which is heavier and cools the engine less efficiently than a conventional head.

Sitting atop the engine I used for testing is an O'Donnell Racing* custom cylinder head that's lighter and cools the engine better than the stock head; and it conveniently matches the purple chassis. For testing, I mounted the engine on the stock, pull-start-type engine mounts.

To install the stock, two-shoe clutch and flywheel, you'll need a standard length crankshaft.

The kit's exhaust system is a muffler, and I don't recommend that you use it; mufflers limit power output and cause excessive heat buildup in the engine. I opted for a Paris* turbo ring pipe and an HPI manifold.

Guiding this HPI missile is the very reliable Futaba* 3PJ PCM radio system. It has just about every function nitro racers need, and it will keep you out of trouble

The small belt that connects the front and rear drive systems is the only one that doesn't have a tension adjustment. This appears to be a weak point, as this belt (which bridges only a 2 1/8-inch gap between the gear shaft and layshaft) has more than 1/2 inch of deflection! This is compounded by the fact that the connecting belt is attached to the spur-gear shaft almost 1 inch outboard of the last bearing supporting the shaft. The natural effect of a belt drive under power is to create tension that tries to pull these two shafts together. The belt may eventually skip, but until it does, the deflection in the spur-gear shaft (due to lack of support) will close the lash between the spur gear and the clutch-bell gear. The result is premature wear of the gears and loss of power.

A small length on both shafts extends beyond the pulleys and even has grooves for E-clips. This seemed to be a natural location for some kind of support between the two shafts. I browsed through the back of the instructions in the optional parts section, and there it was—a tailor-made support for the shafts with a belt-tension adjustment! I'm thankful that HPI recognized the need for such a support bracket and offers it as a factory option. This, in my opinion, is a must-

Higher TECH

The Touring Car for Tuners.

At TECH Racing, our tuners built their reputations on innovative, high performance aftermarket mods for F.1, FWD, 4WD and Mini class competition.

Now they've created the 4WD Touring Car for tuners, the Voggerd T-10. The T-10 is a built around a bulletproof 3-belt, alloy bulkhead 4WD

system. Ball joint suspension and sophisticated, sleeved, multi-chambered progressive damping shocks are also part of the handling package.

In fact, *RC Car Action* called the T-10 "the most adjustable car ever built."

The Voggerd T-10 and Tech Racing options, the highest tech for RC competition.

Tech Voggerd T-10 Features

3-belt, high efficiency full-time 4WD

Duralumin front/rear bulkheads

Duralumin shock towers/supports

High efficiency 64 pitch gears

Lightweight front/rear ball diffs

FRP chassis (Main-2.3/Center-1.5)

Triple upper deck design

Adjustable camber and toe-in

Adjustable caster and skid angle

Sleeved, pressurized oil shocks

Scale: 1:10
Wheelbase: 260.0mm
Weight: 54oz
Width: 187mm
Options: Carbon fiber decks
Carbon shock towers

(Body, electronics, motor, NiCd battery and socket wrench not included.)



The Voggerd T-10. Built by tuners to be raced by tuners. Ball joint pivot joint suspension arms allow caster adjustment. Ride height and skid angle adjustable with shims.

Distributed exclusively by

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BUILDING
& SETUP
TIPS

The Nitro RS4 Racer's instructions don't present very significant challenges,

especially for the experienced builder. My only possible criticism is that few written instructions accompany the exploded views of assembly. My only advice to less experienced builders is that you should pay very close attention to the diagrams and other aids, such as the parts reference guide, to ensure smooth and proper assembly.

■ When assembling the differentials, be sure that two shims aren't stuck together when installed in the diff. The gear diffs can be used as a tuning tool by using heavier or lighter grease during assembly.

■ Although the kit includes a muffler, I highly recommend that you buy a manifold and a high-quality tuned pipe. They greatly improve horsepower output and allow the engine to run much cooler than the standard muffler.

■ Place a 3mm washer between the upper links in the rear and the rear hub carriers. The washer prevents binding in the rear suspension when the upper link and rear hub carrier are screwed together.

■ The inner side of the front suspension arms should be filed down to increase clearance between the arm and the front bulkhead.

■ Take your time when assembling the shocks. There are plenty of places for tiny air bubbles to get trapped during the initial assembly. A little patience will net the smoothest, most consistent damping.

■ Get the optional gear-brace set from HPI. It prevents premature gear wear and prevents the middle belt from skipping.

■ Use thread-locking compound anywhere a screw goes into metal. Nitro engines have a nasty habit of vibrating, and that can loosen parts.

■ Set up the chassis as the instructions suggest. Testing indicates that the standard settings provide the best starting point for most track conditions.

YOU'LL NEED

- .12- to .15-size nitro engine.
- 2-channel radio system.
- 200mm body.
- Receiver battery pack.
- Glow-plug adapter.
- Fuel.
- Fuel filter.

THE COMPETITION

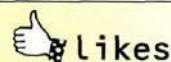
	OFNA Nitro Z10 PRO/SEMI-PRO	HPI Nitro RS4 RACER	HPI Nitro RS4	FSR Nitro BULLET V-12	Mugen PRIME 12
Wheelbase	10.28 in.	10.25 in.	10.25 in.	10.25 in.	10.25 in.
Width (F/R)	7.5 in.	7.5/7.75 in.	7.5/7.75 in.	7.5 in.	7.5 in.
Weight	49.4/49.1 oz.	51 oz.	50 oz.	50.7 oz.	58.5 oz.
Diff type	Ball	Bevel gear	Bevel gear	Ball	Bevel gear
Brakes	Graphite/composite	Fiber	Composite	Graphite	Composite
Exhaust	Muffler	Muffler	Muffler	Tuned pipe	Muffler
List price	\$499.95/\$359.95	\$329	\$329	NA	\$355.99
Available at*	\$325.99/\$237.99	\$217	\$205	NA	\$219.99
Reviewed in	8/98	8/98	6/97	—	7/98

*Prices vary with location

when you run an ultra-fast nitro car.

The servos used for steering and throttle/brake are from Airtronics*. Servo choice is a matter of preference rather than necessity, and my choice may be overkill. The Airtronics 94157 has massive torque and lightning-quick response, and it's the servo I use for the steering in my 1/8 off-road nitro buggies!

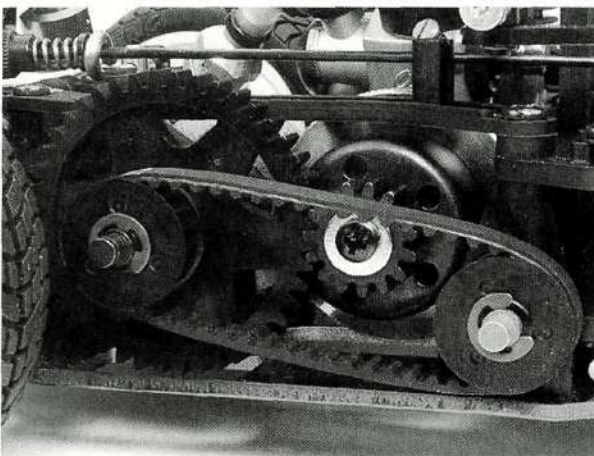
Powering the on-board elements of the



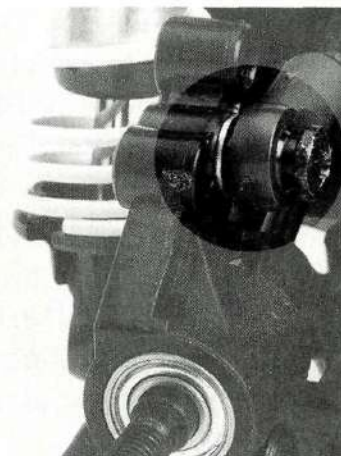
- Extremely smooth, durable shocks.
- Quality and fit of components.
- Fiber brake.
- Best-in-class shocks.



- Gear-shaft brace set not included in kit.
- Bevel-gear diffs.
- Muffler exhaust system.



Above left: the belt connecting the spur shaft to the layshaft requires an optional tensioner. **Above right:** placing a 3mm washer on the screw between the hub carrier and the upper linkage rod prevents the suspension from binding.

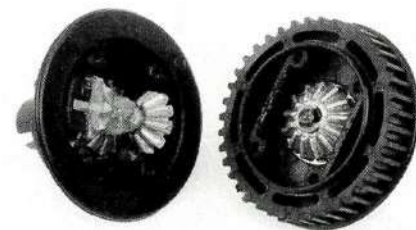


FACTORY OPTIONS

- 2 speed transmission—part no. A910.
Optional parts for A910 2-speed set.
- Second gear set—A818 (39-18), A819 (37-20).
- Graphite:
 rear brace—A935.
 shock mount (F/R)—A570/A218.
 upper deck—A930.
- Swaybar set—A209.
- Gear-brace set—A907.
- Heat-sink engine mounts—A915, A920.
- Tuned pipe for HPI or O.S. .12 or .15 engine—A940.
- HPI oil catch (HPI .12/.15 engines)—A928.
- Super chassis (3mm, 7075S)—A903.
- Clutch bells—A813-A514.
- 39T ball-diff set—A905.
- Light flywheel for pull-start—A925 (40mm), A926 (32mm).
- 39T one-way diff—A906.
- Stainless-steel hinge pins—A261.
- Header for O.S./HPI engines—A950.

radio system is a 5-cell 600mAh receiver pack. The car is designed to use the 4-cell battery holder that is standard with most radio systems, but for performance reasons, I recommend a 5-cell Ni-Cd pack.

I also recommend a few more items. The kit's fuel line is adequate, but I'm more comfortable using thicker, Du-Bro*



Bevel-gear differentials are standard on the RS4 Racer. They're very tough and easy to maintain, but a hardcore racer would appreciate a set of ball diffs (available through HPI).

tubing, and I added a fuel filter to protect the engine from debris that can enter through the fuel tank (there isn't a fuel filter in the kit). The air filter helps protect the engine from debris entering through the carb—the greatest threat to engine health. I used the Motor Saver air filter instead of the one included with the engine.

(Continued on page 191)

BIG MOVIE

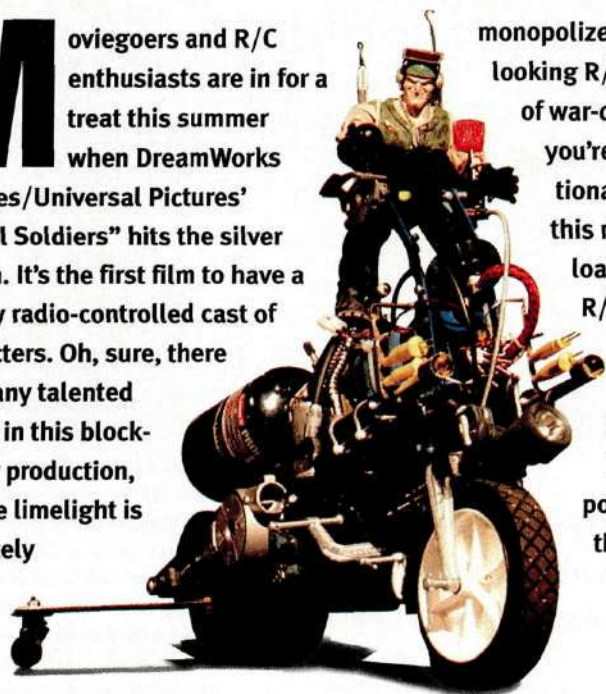


SMALL

A Behind-the-Scenes-Look at R/C in DreamWorks Pictures & Universal Pictures' "Small Soldiers"

George M. Gonzalez

Moviegoers and R/C enthusiasts are in for a treat this summer when DreamWorks Pictures/Universal Pictures' "Small Soldiers" hits the silver screen. It's the first film to have a mostly radio-controlled cast of characters. Oh, sure, there are many talented actors in this blockbuster production, but the limelight is definitely

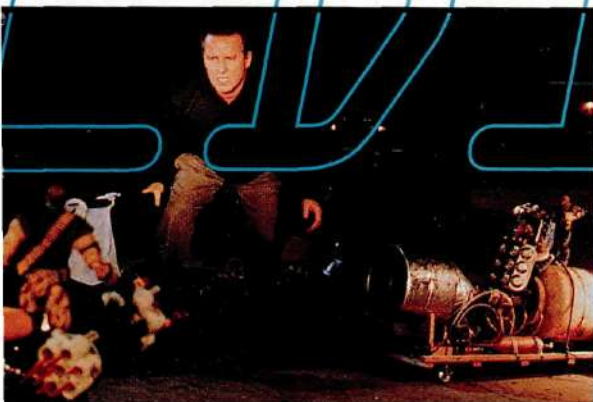


monopolized by the mob of villainous-looking R/C creatures and the platoon of war-crazed R/C commandos. If you're looking for wild but functional home-built R/C vehicles, this movie has 'em by the truckload. These aren't your typical R/C vehicles, though; they're made out of household appliances and power tools and were designed to inflict as much damage as possible. In short: these things are lethal.



Members of the team from Stan Winston Studio used Futaba radio control units to maneuver the suburban assault vehicles used by the Commando Elite. These guys had to control the vehicles that were actually hundreds of feet away by watching them on a studio monitor, which took amazing talent. One puppeteer controlled the action figure while another controlled the vehicle. The puppeteers used multi-channel helicopter transmitters.

SOLDIERS



When he attempts to negotiate a surrender of the Gorgonites, Phil Fimple (Phil Hartman) discovers that the Commando Elite does not take prisoners.

In battle against their enemies, the Commando Elite find new uses for common household items. Anyone for toast?

"Small Soldiers" features animatronic designs and effects created by the Stan Winston Studio, headed by multiple Academy Award winner Stan Winston ("Jurassic Park"). The cutting-edge effects were produced by Oscar-winning Industrial Light & Magic ("Jurassic Park," "Lost World," "Men in Black") under the supervision of Stefen Fangmeir and David Andrews.

Puppeteers from the Stan Winston Studio and a group of talented R/C racers from Robbins Hobby's in Glendale, CA, teamed up to make the action figures and their vehicles come to life for the camera. This was a tedious process

that involved using many Futaba R/C units and just about every dedicated hobby frequency available. Thank heavens there were no R/C tracks or flying fields in the area where this movie was filmed, or the racers and pilots would have been very confused.



I was fortunate to be invited by "Small Soldiers" unit publicist Alex Worman to witness the filming of one of the action sequences at Universal Studios in Universal City, CA. Although they shot only one scene that night, it was a pleasure to see the action figures and their zany vehicles in person. Now you, too, can witness some of the action and adventure of the movie "Small Soldiers" firsthand before it even hits the screen, but remember you saw it here first.

Blending live action with state-of-the-art computer animation, the movie is the story of a battle between a small, intrepid band of monstrous-looking creatures and a platoon of war-loving commandos. But this is not an alien planet; this is suburbia USA, and the soldiers are prototypes of the most advanced action figures ever imagined.



Here, R/C technicians from Stan Winston Studio control the assault vehicles while being pulled on a trailer. The camera is also on wheels and is being carted as well. Scenes like this involved many takes, but the film-makers wanted perfection.



The Commando Elite hitch a ride in a modified red wagon. Hey; we're a club, not a gang!



Above: the Commando Elite assemble their own kind of assault vehicles to fight the battle with their sworn enemies, the Gorgonites. Here, they crash through a wall.



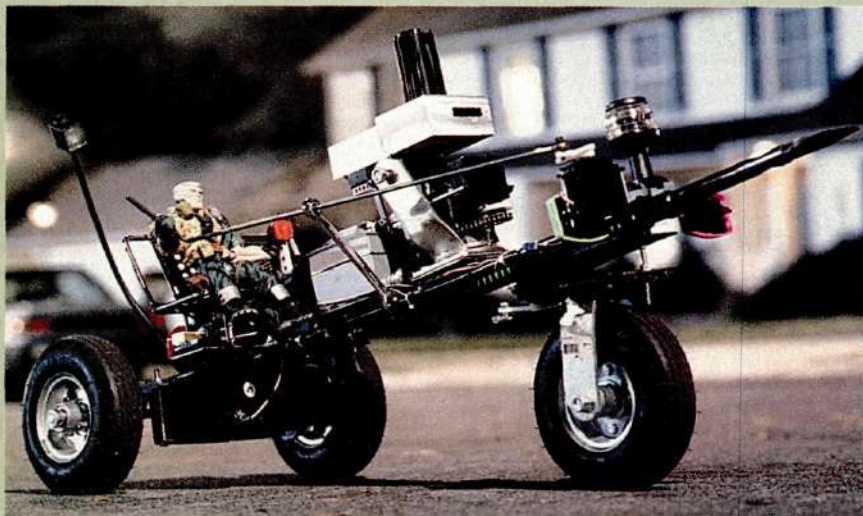
Kip Killigan (get it? kill again), a member of the Commando Elite—action figures with military intelligence—rides the Commando's own kind of suburban assault vehicle in DreamWorks' and Universal Pictures' action adventure, "Small Soldiers."

SMALL VEHICLES FOR SMALL SOLDIERS

Made of common home appliances and power tools, the movie's assault vehicles had to look as if they were crafted by the action figures themselves. They also had to be fully operational and have enough firepower to start world war III.

The task of building the vehicles fell to special-effects master Ken Pepiot under the management of prop specialist Jerry Moss from Stan Winston Studio. Ray Hairapatian from Robbins Hobby's provided the R/C technical support and chose the R/C electronics.

Although each original vehicle is unique and most of the self-powered vehicles—the ones not pushed or pulled by another vehicle—were powered by portable, battery-operated shop drills, Tekin ESCs and Traxxas TQ radios provided the proportional forward and reverse movement. The crews also used several Team Losi Double-X 'CR' racing trucks and an older, Gold-chassis Associated



Major Chip Hazard (voice of Tommy Lee Jones) prefers to scoot around on his own assault tricycle.

RC10. In the movie, these R/C creations pull vehicles such as the red wagon that carts the Commando Elite around.

The vehicles' special effects, e.g., the assault weapons, were operated by Stan Winston Studio puppeteers using Futaba 9ZAPS 9-channel transmitters. To control the action figures and the vehicles' many functions, each puppeteer used two radios that were duct-taped together. I found it interesting that the vehicles' onboard special effects were controlled by \$1,600 Futaba radios, yet the vehicles themselves were operated by \$50 Traxxas units. Some of the puppeteers I talked to admitted that they had their fair share of problems, but radio-equipment failure wasn't one of them.

Where did the difficulties arise? Most were a combination of mechanical and electronic glitches with the onboard special effects. In the end, however, the action figures and their machines worked gloriously, as you'll see in the completed film, which is clear evidence of the crews' hard work and dedication.

Look out for this summer blockbuster. You might pick up a few ideas for that next homebuilt!

BEHIND THE SCENES

"Small Soldiers" began shooting on Monday, November 3, 1997, in Los Angeles under the direction of Joe Dante. The producers are Michael Finell and Collin Wilson, and Paul Deason serves as co-producer. Blending live action with state-of-the-art computer animation, the movie is the story of a battle between a small, intrepid band of monstrous-looking creatures and a platoon of war-loving commandos. But this is not an alien planet; this is suburbia USA, and the soldiers are prototypes of the most advanced action figures ever imagined.

The story is set in the fictional town of Winslow Corners, OH, and it was filmed on sound stages and on location in and around Los Angeles, Universal City and Orange County, CA. Kirsten Dunst ("Interview With the Vampire," "Jumanji") stars as Christy Fimple, a pretty high school freshman who inadvertently gets caught in the battle of the action figures. Gregory Smith ("Harriet the Spy") plays Alan Abernathy, a mischievous teenager who works in his father's toy store and gets caught in the crossfire in the war between the two rival toy factions.

Jay Mohr ("Jerry Maguire," "Picture Perfect") stars as Larry Benson, a self-absorbed toy designer who creates a squad of commando action figures as cutthroat as he is. Phil Hartman ("News Radio," "Saturday Night Live") stars as Phil Fimple, the world's most annoying neighbor and the father of a young girl caught up in the war. Wendy Schaal ("The Burbs," "Innerspace") plays Fimple's wife, Marion. David Cross ("Mr. Show," "The Cable Guy") stars as the nerdy toy designer Irwin Wayfair, whose action figures, the Gorgonites, engage in an all-out war with the commandos.

Kevin Dunn ("Picture Perfect," "Chain Reaction") plays Stuart Abernathy, the owner of a small-town toy store who isn't prepared for the kind of toys that are about to hit his shelves. Ann Magnuson ("Clear and Present Danger," "Cabin Boy") plays Stuart's wife, Irene, who is just as surprised with the new inventory. Dick Miller ("Gremlins," "Gremlins 2") plays the part of Joe, the truck driver who delivers the new line of soldiers to Abernathy's store. Miller has previously appeared in over 100 feature films and scores of TV projects and is a favorite casting choice for director Joe Dante.

"Small Soldiers" is planned for release in the summer of '98 and will be distributed domestically by Dream Works and internationally by Universal. ■



BUDGET BUGGY GUIDE

Best-buy buggies hit the dirt!

by the Staff of R/C Car Action



ANYONE WHO SEES an off-road R/C buggy in action is sure to want to get into R/C himself. But many are discouraged by the initial cost, not only of the racing vehicles, but also of the radio, charger, batteries and everything else you need to get started. This initial "sticker shock" turns many potential hobbyists away from R/C and toward other, more economical forms of recreation.

Associated Electrics, Team Losi, Kyosho, Tamiya, Traxxas, MRC and Schumacher all offer high-quality, sport-level (read:

affordable) 2WD off-road buggies that come with many of the items needed to start. If pointed in the right direction, you can buy a good-quality R/C product that won't break your budget but will provide you with plenty of R/C excitement.

With that in mind, we decided to gather every sport-level buggy we could get our hands on and show you what's available in this extremely important segment of our hobby. We subjected the cars to the rigors of everyday bashing at a Connecticut off-road track—Xtreme R/C in Brookfield. If you're tempted to start R/C'ing or you'd like to add an open-wheel 2WD racing buggy to your R/C collection, read on and you'll find out which is right for you.



PHOTOS BY WALTER SIDA

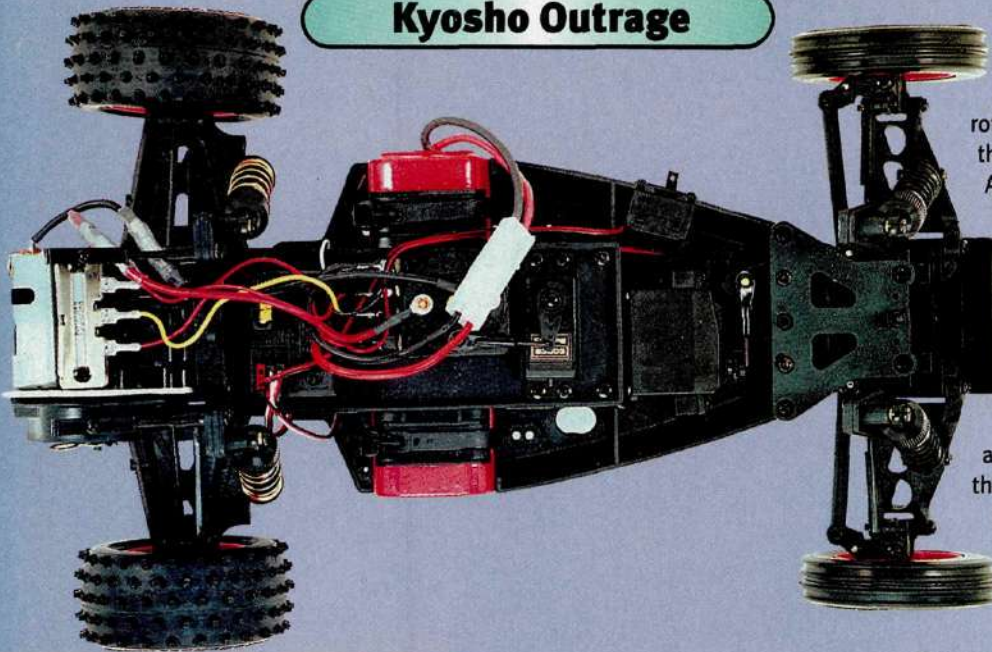
THE RATING GAME

We tested eight buggies from seven manufacturers. Because the cars vary so much in features and price and are available in various stages of completion, we placed each car in one of the three following categories.

- **Group 1.** These cars will perform fairly well on an off-road track, but they either do not offer tuning features or are not built to take a tough racing environment. These cars were designed for general sport running and backyard bashing, but they're all hobby-quality R/C products and are supported by a full line of replacement and hop-up parts. Do not confuse them with toy R/C cars.
- **Group 2.** With basic racing features and upgradable platforms, these are suitable for backyard bashing and mild club racing, but to race competitively, you'll need some upgrades.
- **Group 3.** These all offer the necessary racing features and are built to take the abuse of heated competition. We think they can win stock-class trophies right out of the box.



Kyosho Outrage



One of the least expensive buggies in this field, the Kyosho Outrage is packed with value. The rugged drive train with gear diff has been used by Kyosho for years because of its reliability. A rotary speed control and 540 motor are included in the kit to get you up and running inexpensively. Although these items don't provide blistering speeds and long run times, they work well enough to get a first-time driver acquainted with operating R/C cars. Oil-filled dampers and race-proven nylon-composite suspension arms can withstand an abundance of abuse from the first-time driver, and they keep the car sturdy through the rough stuff.

Another feature that makes the Outrage an attractive buy for the first-time R/C enthusiast is the fact that it's 80 percent pre-assembled. The other 20 percent of assembly simply requires building the shocks, mounting the tires and installing the radio. Kyosho eases these steps with a detailed instruction manual. Any novice can have this car up and running in no time. The Outrage is offered in kit form with unpainted body or 80 percent assembled with painted body, like our test version. The Kyosho name is known for durability and this car represents the name well. The Outrage package gets you up and running affordably.



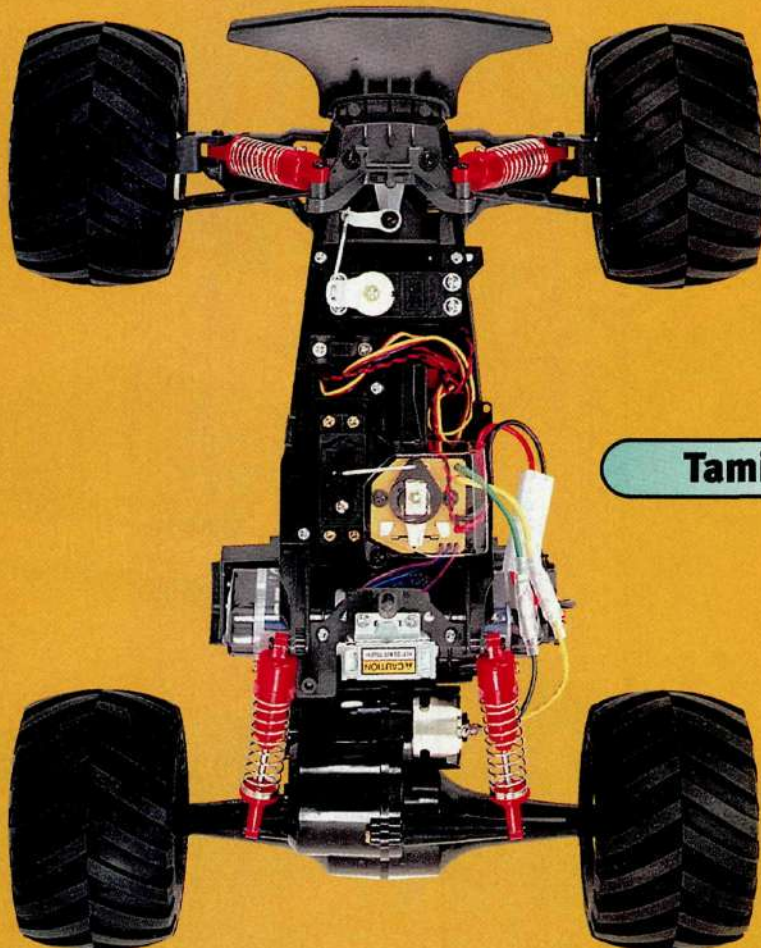
• Best for beginner to backyard racer.

Likes

- Very inexpensive.
- Quick, easy assembly.
- Durable.
- Excellent first car.

Dislikes

- Bouncy suspension.
- Speed is great for beginners, but slow otherwise.
- Battery retained by fussy tie straps.

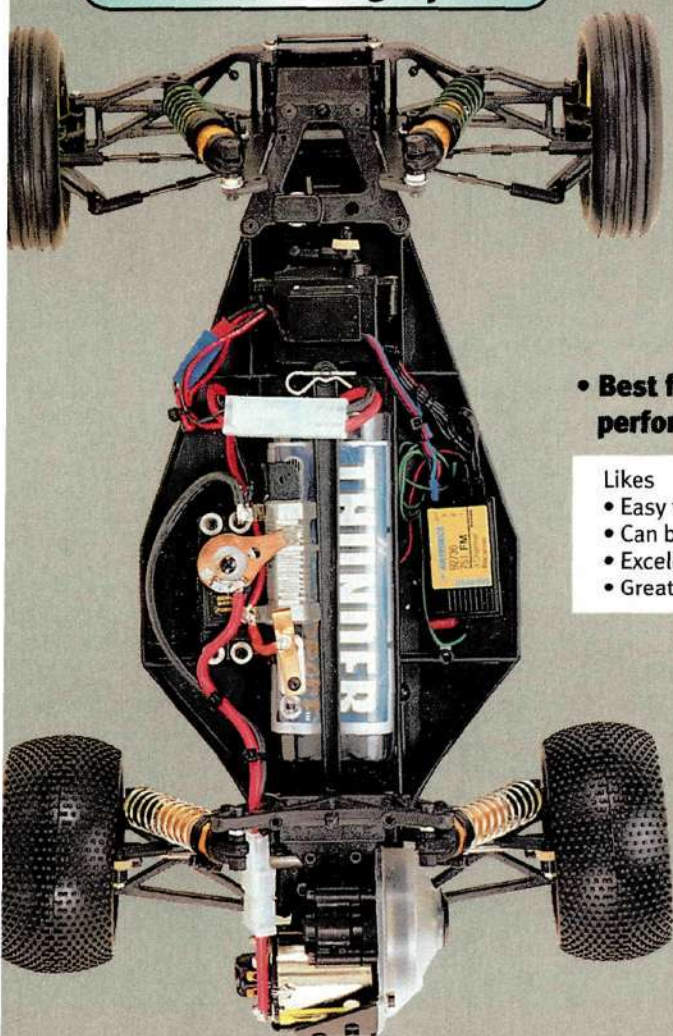


Tamiya Mad Bull

By far the simplest vehicles of the bunch, the Fighter RX and Mad Bull score highly in durability and ease of assembly. Each machine required only about half an hour to assemble! Both are built around the same tough, ABS tub chassis that features an easy-to-use stick-pack battery holder. Friction shocks damp the independent front suspension and the rigid-axle rear end. The molded ABS bodies don't require the special painting care of a Lexan shell, and the included graphics make it easy to build a good-looking, futuristic car. A three-step mechanical speed control and 540 motor are included and provide surprisingly good speed.



Associated B3 Sport



One of the most well-known companies in the R/C industry today, Team Associated has just made entry-level racing easier with a sport version of their new B3 buggy. Here is the latest racing technology available at a low cost.

The B3's solid composite chassis is extremely durable and is an ideal platform for the rest of the suspension components. Thanks to its completely adjustable chassis, this entry-level racer can quickly become a pro with the addition of some well-chosen, high-performance components. The Quadrasymmetric (that's a big word) suspension makes this car a breeze to handle through rough terrain, while the low-profile Stealth tranny has proven to be bulletproof in even the harshest conditions. Aluminum shocks, bronze bushings, servo-saver bellcrank steering and a lot more make the B3 Sport a great value for the price.

• Best for beginning racer or budget-conscious performance enthusiast.

Likes

- Easy to build.
- Can be easily converted into a race machine.
- Excellent handling.
- Great parts quality.

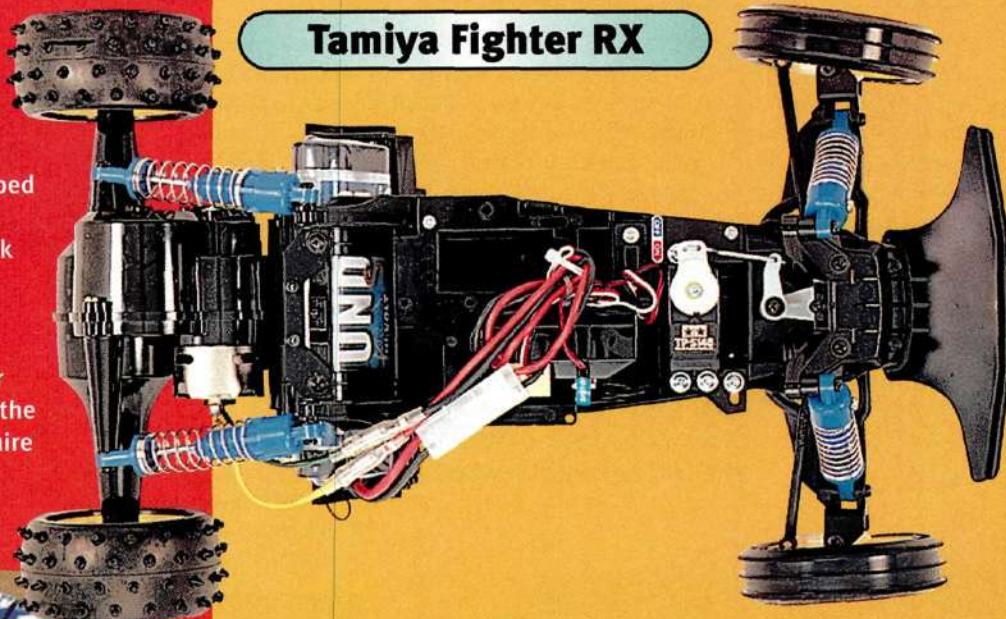
Dislikes

- If you wanna play, you gotta pay—this is the most expensive buggy of the bunch



Parts quality is topnotch, but these are definitely beginner machines. The cars aren't adjustable in any way, and performance is compromised by the constantly changing camber angles of the swing-arm front suspension, and the virtually undamped suspension gives a pogo-stick-like ride. However, they are fun to drive, easy to work on and able to take a pounding. The Mad Bull is the more stable machine thanks to its truck wheels and tires (courtesy of Tamiya's Midnight Pumpkin), but either car is an excellent choice for the newcomer to the hobby, particularly younger folks who require extra-easy assembly. The Fighter RX and Mad Bull will inspire confidence and are undeniably fun.

Tamiya Fighter RX



• Best for first-time R/C modeler with limited building skills.

Likes

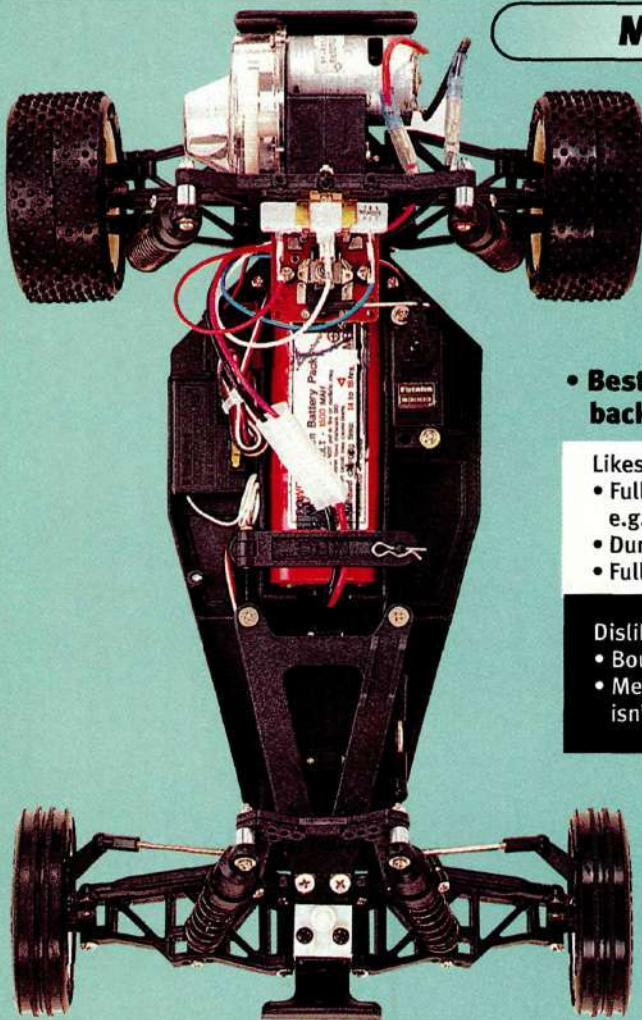
- Easy to build.
- Cool Robotech-like bodies.
- Excellent parts quality.
- Bomb-proof.

Dislikes

- Non-adjustable suspension.
- Limited upgrade potential.



MRC Vortex



• Best for beginners and backyard racers.

Likes

- Fully adjustable components, e.g., shocks and differential.
- Durable components.
- Full assembly.

Dislikes

- Bouncy suspension.
- Mechanical speed control isn't reliable.



The MRC Vortex has many high-performance buggy features, but without the high price. The chassis and many of the suspension components are made of resin compounds that withstand abuse but keep the car light. Adjustable, oil-filled shocks and spring tension allow you to dial handling to suit track conditions. An adjustable ball differential and three spur-gear options further enhance the car's tunability.

Our factory-assembled test sample came out of the box painted and with Futaba sport radio gear, 20-turn 540 motor, mechanical speed control and battery already installed. We only had to charge the battery, install eight AA batteries in the radio control and cut and "decals" the body.

Losi Double-X Sport

This feature-packed buggy includes most of the features of the wildly popular Double-X Sport racer in a bushing-equipped version with or without a wiper-type speed control and motor. Some of the excellent features that shine through are: anodized-aluminum shocks, a competition-ready ball differential, fully adjustable suspension, tough Stiffezell molded parts, stock motor and mechanical speed control. If you have the skills (and you keep the metal bushings lubed), the Double-X will not slow you down on a racetrack.

Assembly is time-consuming but not difficult, and once you've built a Double-X, you will be able to build just about anything. The only rough part to building this race-oriented kit was inserting the hinge pins. We found some of them difficult to install; the holes had to be drilled for easier installation. But the end product was well worth the extra effort.

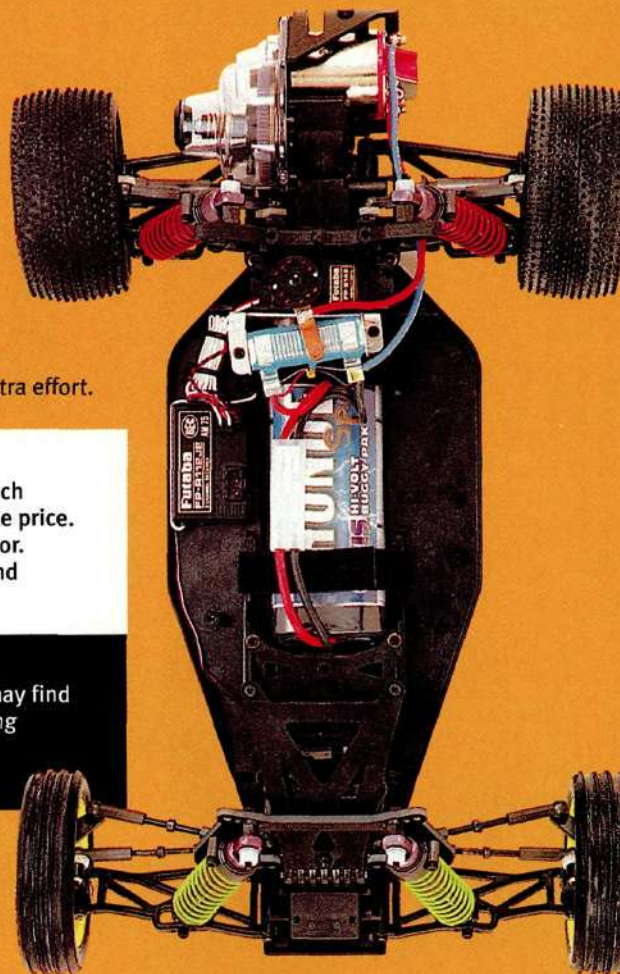
• Best for beginning racer or budget-conscious performance enthusiast.

Likes

- Proven Double-X tech at a more affordable price.
- ROAR-legal kit motor.
- Excellent shocks and suspension.

Dislikes

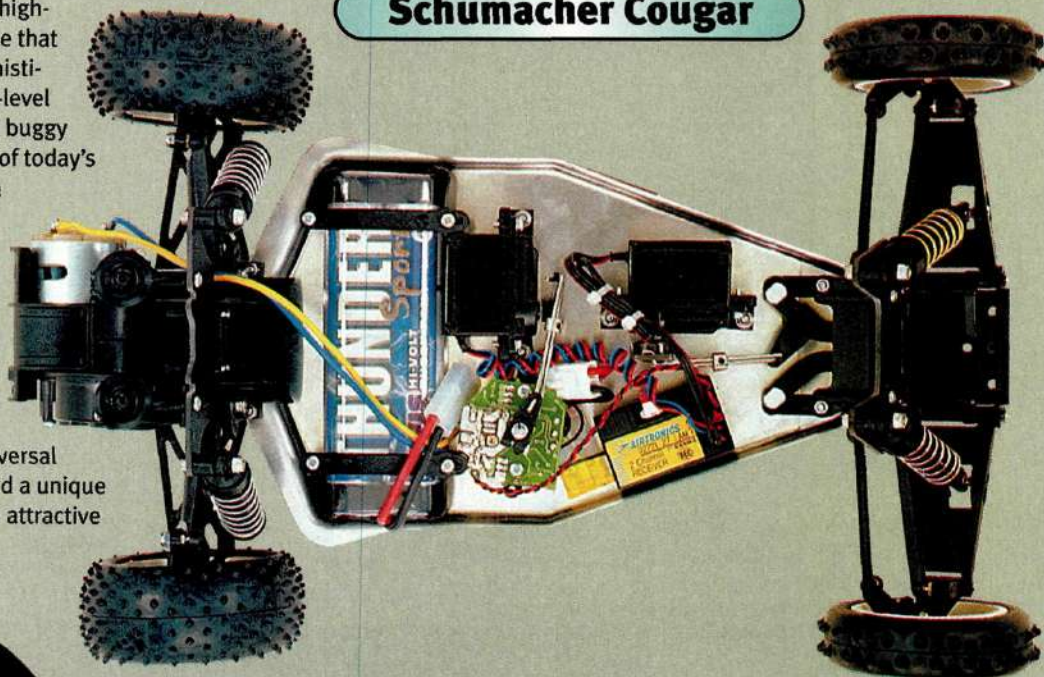
- First-time buyers may find a few of the building steps difficult.



Schumacher is a name often associated with high-tech, sophisticated R/C cars. Although it's true that their race machines are among the most sophisticated, they haven't forgotten about the entry-level racer. The Cougar is Schumacher's entry-level buggy that utilizes some of the intricate technology of today's cars in a package that will give the beginner a bang for his buck.

The Cougar uses a stamped-aluminum chassis as a backbone. The aluminum chassis is a sturdy platform for the composite suspension components. Oil-filled adjustable shocks are located on all four corners and are mounted to fiberglass shock towers. The tough tranny on this car utilizes an adjustable ball differential and universal telescoping drive shafts. A 540-type motor and a unique mechanical/electronic speed control make an attractive combo for any beginner.

Schumacher Cougar



- **Best for beginning racer or budget-conscious performance enthusiast.**

Likes

- Oil-filled shocks.
- Aluminum chassis.
- High-tech mechanical/electronic speed control.
- Rigid plastics.

Dislikes

- Composite motor plate does not dissipate heat.



Traxxas Bandit

It is a great first-time vehicle for those who have dreams of laying down rooster tails, getting sideways, and skying double jumps with jackrabbit-like agility. The Bandit is available ready-to-run with radio, 20-turn motor and 3-speed forward and reverse mechanical speed control included, so all you need to buy are a charger and some batteries.

The Bandit is built around a fiber-composite, double-deck chassis. A molded battery holder safely secures either a 6- or 7-cell battery pack. A racing-style, dual bellcrank steering system smoothly controls the steering duties. Extra-long, fiber-composite suspension arms and oil-filled, coil-over shocks smooth out the terrain, while front centered kingpins with "live" front axles help prevent wheel chatter. A racing-style, 3-gear tranny with 48-pitch gears and telescoping U-joint drive shafts lay down the power. Other features include: nylon-composite shock towers, interchangeable pinion and spur gears, aggressive off-road rubber tires, adjustable steering tie rods and a scale-looking, single-seat buggy body with decals and rear wing.

The Bandit is supported by a full line of hop-ups such as bearings, slipper clutch, ball diff, hard-anodized Ultra Shocks and much more. Traxxas products are available at most hobby shops, which means very good parts availability and knowledgeable support.

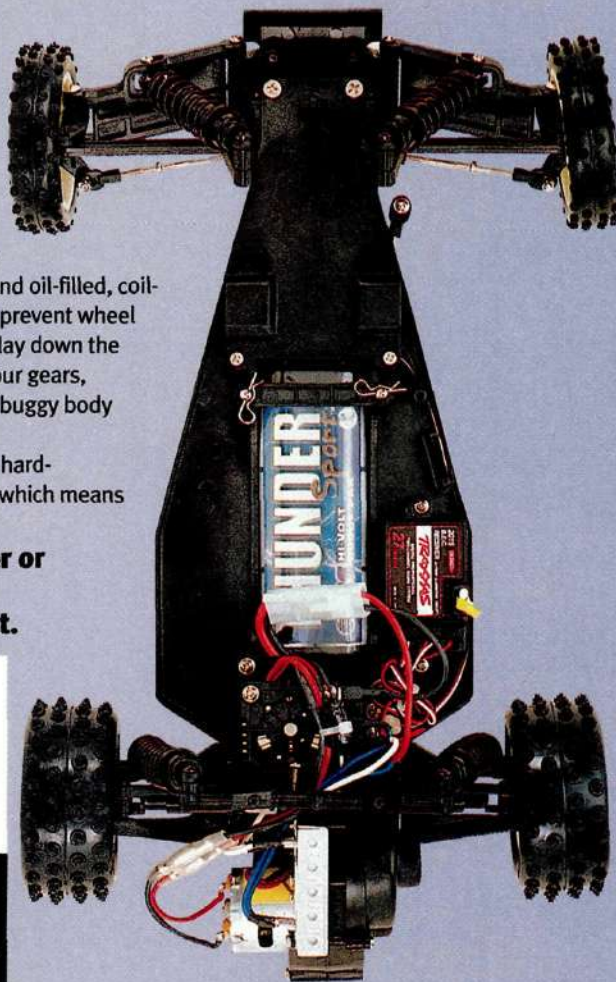
- **Best for beginning racer or budget-conscious performance enthusiast.**

Likes

- Ready-to-run fun.
- Extra-rugged construction.
- Very affordable.
- Great performance.
- Excellent factory support.

Dislikes

- Molded motor mount does not dissipate heat very well.



GROUP 1

	Team Losi Double-X Sport	Associated B3 Sport
Wheelbase	10.625 in.	10.375 in.
Width (F/R)	9.625/9.875 in.	9.875/9.75 in.
Weight	3 lb., 10.5 oz.	3 lb., 9.3 oz.
Diff type	Racing ball	Ball
Chassis	Stiffezell	Composite/aluminum
Motor	Stock	Stock
Speed control	Mechanical	Mechanical
Damping	Oil shock	Oil shock
Suspension	Independent A-arm/ upper camber link	Independent A-arm/ upper camber link
Adj. camber	Yes	Yes
Adj. toe-in	Yes	Yes
Adj. shocks	Yes	Yes
List price	\$239.95	\$250
Available at*	\$123.99	\$135

GROUP 2

	MRC Vortex	Schumacher Cougar	Traxxas Bandit
Wheelbase	11 in.	11.25 in.	11 $\frac{3}{8}$ in.
Width (F/R)	9.75/10.6 in.	9.25/9.75 in.	12 $\frac{1}{4}$ in.
Weight	3 lb., 7.5 oz.	3 lb., 6 oz.	45.8 oz.
Diff type	Ball diff	Ball diff	Planetary
Chassis	Composite semi-tub	Aluminum	Single deck
Motor	20-turn fixed-endbell	540 type	20-turn stock
Speed control	3-step mechanical	Turbo electronic	Mechanical
Damping	Oil shocks	Oil shocks	Oil shocks
Suspension	Independent	Independent	Independent
Adj. camber	No	No	No
Adj. toe-in	Yes	No	Yes
Adj. shocks	Yes	No	Yes
Bearings/bushings	Bushing	Ball bearings	Bushings
List price	NA	\$219.99	\$150/\$260 RTR
Available at*	\$85-\$110/\$150-\$180 RTR	\$139.50	\$100/\$173 RTR

GROUP 3

	Kyosho Outrage	Tamiya Fighter RX	Tamiya Mad Bull
Wheelbase	10.8 in.	11.2 in.	11.2 in.
Width (F/R)	9.4 in.	9.3 in.	12.4 in.
Weight	3.3 lb.	2.9 lb.	3.2 lb.
Diff type	Gear	Gear	Gear
Chassis	Plastic tub	Plastic	Plastic
Motor	540 type	540 type	540 type
Speed control	Mechanical	Mechanical	Mechanical
Damping	Oil shock	Friction	Friction
Suspension	Double wishbone	Independent/ rigid rear axle	Independent/ rigid rear axle
Adj. camber	No	No	No
Adj. toe-in	No	No	No
Adj. shocks	Yes	No	No
Bearings/bushings	Bushing	Bushing	Bushing
List price	\$119.99/\$139.99 (ARR)	\$98	\$123
Available at*	\$79.99/\$89.99 (ARR)	\$59.99	\$75.99

*Prices vary with location



THE POINTS WE PONDERED

PERFORMANCE: the whole driving experience; jumping, cornering, acceleration, etc.

EASE OF ASSEMBLY: the best-rated kits went together without modification. Lower-rated kits required extra hand fitting or had less clear instructions.

QUALITY/DURABILITY: this rating was influenced by the precision of the parts, appearance and "feel," and of course, whether or not they broke.

COMPLETENESS: what else do you need to buy? We rated the

kits in their most complete form (some are available with or without motor, speed control and other items).

ADJUSTABILITY: this reflects the cars' capacity for tuning to track conditions.

VALUE: the proverbial "bang for the buck."

HOP-UP POTENTIAL: how much stuff can you add? We considered factory and aftermarket hop-ups.

The addresses of the companies featured in this Buggy Guide are listed alphabetically in the Index of Manufacturers on page 209. ■

How do they measure?

	Poor	Fair
Performance		
Kyosho Outrage		
Tamiya Fighter RX		
Tamiya Mad Bull		
Traxxas Bandit		
MRC Vortex		
Schumacher Cougar		
Associated B3 Sport		
Team Losi XX Sport		
Ease of Assembly		
Kyosho Outrage		
Tamiya Fighter RX		
Tamiya Mad Bull		
Traxxas Bandit		
MRC Vortex		
Schumacher Cougar		
Associated B3 Sport		
Team Losi XX Sport		
Quality/Durability		
Kyosho Outrage		
Tamiya Fighter RX		
Tamiya Mad Bull		
Traxxas Bandit		
MRC Vortex		
Schumacher Cougar		
Associated B3 Sport		
Team Losi XX Sport		
Completeness		
Kyosho Outrage		
Tamiya Fighter RX		
Tamiya Mad Bull		
Traxxas Bandit		
MRC Vortex		
Schumacher Cougar		
Associated B3 Sport		
Team Losi XX Sport		
Adjustability		
Kyosho Outrage		
Tamiya Fighter RX		
Tamiya Mad Bull		
Traxxas Bandit		
MRC Vortex		
Schumacher Cougar		
Associated B3 Sport		
Team Losi XX Sport		
Value		
Kyosho Outrage		
Tamiya Fighter RX		
Tamiya Mad Bull		
Traxxas Bandit		
MRC Vortex		
Schumacher Cougar		
Associated B3 Sport		
Team Losi XX Sport		
Hop-up potential		
Kyosho Outrage		
Tamiya Fighter RX		
Tamiya Mad Bull		
Traxxas Bandit		
MRC Vortex		
Schumacher Cougar		
Associated B3 Sport		
Team Losi XX Sport		

GET UP TO SPEED WITH ...

- 109 **INNOVATOR AT WORK** • Interview with Pro-Line/Jaco/Protoform's Todd Mattson
- 110 **SPEED SHOP** • Team Associated's new VCS Micro Shock and 1/10-scale oval car • Associated's Factory Team's new blue titanium tie rods • Schumacher's Tyre Belting Tape • Trinity's Real Time Battery Conditioner and Discharger
- 112 **NEWS FLASH** • Team Orion opens U.S. facility
- 116 **RACER PROFILE** • Team Trinity/Team Losi factory driver Matt Francis
- 116 **RACER TIP OF THE MONTH** • Words of wisdom from Team Yokomo/Team Maxtec factory driver Barry Baker

If you're a serious racer, you probably own several sets of Pro-Line or Jaco tires and a few Protoform bodies. Pro-Line/Jaco/Protoform is a company that's synonymous with racing, and its products have helped win numerous national and world championships. Company president Todd Mattson is this month's "Innovator At Work," and we're certain that after you've read the interview, you'll know why this company is so successful.

Speaking of interviews, IFMAR World Champion and Team Trinity/Team Losi factory driver Matt Francis is the topic of discussion in this issue's installment of "Racer Profile." As an added bonus, we have a "Racer Tip of the Month" from Team Yokomo/Team Maxtec factory driver Barry Baker. And that's not all; you'll find some hot racing products from Associated and its Factory Team, Schumacher and Trinity in our "Speed Shop," plus some exciting news from Team Orion.

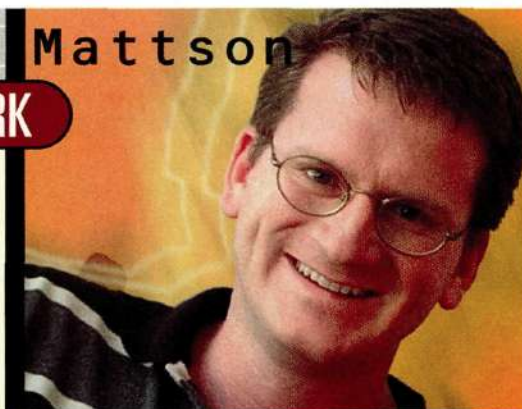
Pro-Line's national and world championship-winning rubber off-road tires are favorites among competitive off-road racers around the country.

More and more on-road and oval racers depend on Jaco's world championship performance to deliver the consistent traction they require. Protoform bodies are also popular among racers of all levels and have also won many world and national championships.

There's no doubt that many of our readers not only are familiar with Pro-Line/Jaco/Protoform but also own several of their products, but many may not be too familiar with Todd Mattson, the company's president—that is, unless you're a sponsored racer or you work in the industry. We at *R/C Car Action* recently had the opportunity to meet with Todd and take a tour of the Pro-Line facility, and this interview is a result of that meeting. So here's your chance to find out more about Pro-Line/Jaco/Protoform, one of our industry's leaders.

INNOVATOR AT WORK

Todd Mattson



R/C Car Action: What is your educational background, and what kind of business were you in before you became involved in the R/C industry?

Todd Mattson: Well, I attended Westmont College in Santa Barbara, CA, which is a small, private, liberal arts college where I received my degree in business economics. Right out of school, I took the first job I could find in Santa Barbara. As it turned out, I joined up with a company that I actually had a marketing internship with during college, and went to work in their marketing division. Our primary business in marketing was airshows, and we put on over 200 shows a year. We secured and managed promotional event marketing contracts for large companies like General Motors, Kraft General Foods, Kodak, Fuji, Metropolitan Life, so I had some significant exposure to corporate America right off the bat. I gained a lot of experience during my three years with this company. I started out as a promotional assistant and quickly moved up to a promotions manager position. During that time, I met my wife, Amie, in Santa Barbara. The job required extensive travel, which was not conducive to raising a family down the road.

RCCA: Why did you decide to join forces with

Pro-Line, and when did this venture first take place?

TM: I met Joe Warren [owner of Pro-Line at that time], and he expressed an interest in filling an open marketing manager position at Pro-Line. I felt that marketing and promotions were areas of interest, and they were also the aspects of business I enjoyed the most. I liked the full-circle aspects of the marketing manager position, but the opening also allowed me to gain skills in other areas of marketing such as advertising, full promotional strategies and marketing plans.

Those were the full-circle marketing projects that I wanted to take on as a marketing manager for a company like Pro-Line. I also had ambitions of taking on more general manager responsibilities and felt that the potential was definitely there in the future with Pro-Line. I think I actually joined Pro-Line in 1991, right before the Chicago hobby show, which was my first exposure to the R/C hobby industry.

RCCA: So you weren't actually familiar with R/C cars until you started talking with Joe Warren of Pro-Line?

TM: No. Actually the first piece of R/C informa-

tion that I thumbed through was the '91 *Radio Control Car Action* "Buyers' Guide." I went through that buyers' guide and checked it out thoroughly. I was also on the road quite a bit doing the airshows, so I stopped in and visited a number of hobby shops before I actually took the position with Pro-Line. My first actual experience driving an R/C car was when I started at Pro-Line. During my first few days at Pro-Line, I built my first RC10. I would fool around with it every day on a dirt lot behind Pro-Line during lunch with Pro-Line's engineer, Tim Clark. We also raced every week at a local track. I have some really great memories of those first few months at Pro-Line and liked the idea of getting involved with an industry that seemed so young and had so much growth potential.

RCCA: What were some of the personal and business goals that you set when you first became involved with Pro-Line?

TM: As a marketing manager at Pro-Line, I developed ambitions of becoming more of a general manager. I don't know if it's my nature, but whenever an issue would come up, I wanted to be involved with that issue on all levels, and I've

Speed Shop

Associated debuts new 1/10-scale oval car

Team Associated's chief designer, Cliff Lett, helped by veteran oval racers Frank Polimeda and Duane and Darryl Silva, has created the next generation of oval racers. It takes advantage of all the latest racing technology and includes many features previously available only as aftermarket hop-ups. The new RC10L3 Oval is designed to have the tuning flexibility necessary to compete on a wide variety of tracks. From short, flat carpet ovals to concrete superspeedways, the L3 Oval is designed to do one thing: win races.

The car features a new graphite chassis with wider battery slots that allow the tuner to move the cells farther to the left, which was not possible on the previous version. The chassis also provides for a fifth body mount (to support the hood of a



New products from the A-Team

NASCAR-type body) and the wheelbase is adjustable, so the car can be shortened more than 1 inch for stock-class racing.

Up front, you'll find Associated's tried and true dynamic strut suspension with the addition of inline axles, a protective foam bumper and blue titanium tie rods, courtesy of Associated's new "Factory Team" line of aftermarket performance parts.

The most notable changes have been made to the car's rear end. First, the single-shock, T-plate rear suspension has been replaced with a 3-shock design. Two new VCS micro shocks handle the side-to-side damping and tweak, thereby eliminating the need for tweak screws. A larger VCS center shock provides smooth, consistent damping. The included aluminum wheel hubs are incredibly trick and eliminate the need for expensive aftermarket hop-ups. Both hubs have been milled to remove as much weight as possible, and the left wheel hub has a clamping design that's preferred by most oval racers.

In addition, the L3 Oval includes an adjustable rear pod that allows two offset positions and a new Factory Team carbon rear axle that, according to Associated, is the strongest and lightest available. The car also includes a complete set of Jaco tires mounted on the lightweight composite wheels. Through its new Factory Team line, Associated offers several performance-increasing aftermarket parts, as well. Part no. 8018; \$285.

INNOVATOR AT WORK

(Continued from previous page.)

always had a strong desire to make things better. So becoming a general manager was definitely one of the personal goals I had set early on.

My other goal was actually more of a dream, and that was to run and own my own business, but I felt that in order to succeed, I would have to go back to school and get a master's degree. Ironically, I started the MBA program right about the time I achieved my first goal: I was promoted to general manager of Pro-Line. During the latter part of my schooling, Joe Warren and I completed an agreement that allowed me to buy into the company, and I became a partner in the business.

RCCA: What is your present position with Pro-Line, and what are some of the goals you've set for the future?

TM: My current title is president of Pro-Line. Many of my present goals are more related to the company and less related to feeling as if I have some personal accomplishment that I need to achieve. My goals are more oriented toward the company's growth and success in the future. Working with Pro-Line has been a lot of fun, and that's one of the benefits that has come out of Joe's and my partnership. Being able actually to develop a group of people who are working toward a common goal—continually improving an organization and its products—has also been very rewarding.

RCCA: Pro-Line is on the cutting edge of R/C racing technology and is always introducing new and innovative products; how does Pro-Line stay one step ahead of the rest regarding the release of new products?

TM: Looking back over the history of the company, Pro-Line has always been committed to the area of new product development and products that provide performance enhancements. We try to listen to our customers, dealers and distributors to understand which needs are not being met. In the past, we've predominantly provided rubber tires, but our extension into other areas like relationships with Jaco and Protoform is a direct result of customer input.

We've also released a full line of wheels over the last year to complete our existing tire line. Another reason Pro-Line is always on the cutting edge is because we do everything in-house. The entire chain of events—including concept, prototyping, product design, tooling, manufacturing and packaging—are all done under one roof. This gives us more control over issues such as quality control, development time and product supply, all of which we feel are part of the value that we've created for our customers.

We also feel that having complete control is what keeps us competitive and on the leading edge of new areas in the hobby. Of course, when things don't go according to plan, we have no one to blame but ourselves.

RCCA: Do you feel that feedback from sponsored drivers has something to do with Pro-Line's continued success?

TM: Definitely; racer feedback has been a key factor in the advancement of our products, but has also driven the R/C industry as a whole. Because of the competitive nature of R/C racing, we



Todd Mattson, his son Trevor and their family dog enjoy a sunny Southern California afternoon.

always want to give our drivers an advantage over their competition, and I think that many of the technological advancements we've witnessed are directly attributable to the spirit of competition. Pro-Line is always pushing the envelope of performance, and we feel that ultimately, the customer has benefited greatly from our relationships with our racers. Competition can be a little painful at times because you may not win every time, but it always brings out the best products.

RCCA: Have the ventures with Jaco and Protoform been successful? What were some of the reasons Pro-Line decided to become partners with these companies?

TM: In the early '90s, Pro-Line acquired MRP [Model Racing Products]. These were interesting times because we expanded Pro-Line's R/C car-body range and at the same time, we operated an



Let Schumacher belt your rubber

Belted tires have become popular in touring car racing because they offer so many performance benefits. The function of an inner reinforcing belt is to offer additional support to the tire carcass, and this reduces tire "growth" at high speeds and prevents the contact patch from becoming distorted when used with today's super-soft tire compounds. Unfortunately, belted tires are a little more expensive than non-belted meats, and you can't always find belted versions of the compound or tread pattern you prefer. Well, Schumacher has just released its Tyre Belting Tape—perfect for racers who would like to make their own belted tires out of their favorite touring car skins.

Thanks to its super-sticky adhesive backing, the tape is easy to install on the inside of the tire; just apply two winds of tape around the inner tire carcass, cut off the extra tape and you've finished. The tape is 3cm wide, which means that it will cover a wide range of applications. For proper installation on touring car tires of various widths, be certain to follow the trimming guidelines provided with the tape.

Tyre Belting Tape is also useful for 1/10- and 1/8-scale gas off-road applications and just about any other high-power application for which tire growth is a problem. For years, 1/8-scale gas off-road racers have stuck strapping tape to the insides of their tires to prevent them from becoming "pizza cutters" every time the diffs unload during cornering. These racers will find Schumacher's Tyre Belting Tape far easier to use and more effective than strapping tape. Part no. U2051; \$4.95.



Trinity Real Time Battery Conditioner and Discharger



Here's an item from Trinity that racers aren't going to want to do without: the Real Time Conditioner and Discharger. It's designed to individually discharge each cell in a side-by-side or saddle-pack configuration to identical safe voltages. The best part is that it will discharge a fully charged 2000mAh pack in one hour—an all-night process for some discharge trays. Racers can use the Trinity discharger at the track by placing their dumped cells in it after every heat. The discharger has six LEDs that turn off the moment the corresponding cell has been completely discharged. When all six LEDs turn off (usually within minutes), your pack has undergone a deep discharge cycle that ensures a perfect charge the next time around. The unit also includes a built-in fan to keep things cool while the unit is operating. Part no. RC5099; \$39.99.

R/C boat company. I think the real passion of the business was defined in those days because everyone realized that our passion was for R/C cars, not R/C boats, so we sold the R/C boat interests within three years. During this time, we developed a relationship with Jack Rimer of Jaco, and the stage was set for taking our R/C body line to the next level.

We realized that we wanted to be a leader in all areas of the tire-accessory segment but did not have the expertise necessary to become successful in the foam-tire market. At Jaco, Jack was actually an OEM supplier for Pro-Line, and one day, he and I started talking about the possibilities of combining our talents. We were very impressed with Jack's enthusiasm and expertise in the on-road, foam-tire market and felt that if we could somehow combine his foam-tire expertise with our marketing and tool-making capabilities, the two companies together would form a racing alliance that would be hard to beat. The venture was successful right from the start, and the market acceptance was way beyond our imagination.

Truthfully, we enjoyed the experience with Jaco so much that it was kind of what led us to the Protoform relationship with Dale Epp. I've always enjoyed the relationship side of business, and I realized that after the Jaco success, it was time we brought another partnership relationship into our business. We had gained some experience in the body market through our MRP acquisition, but we felt that we weren't passionate enough about R/C bodies to successfully create a better product in the market. The more I asked industry people about passion in R/C body mold-

making, the more Dale Epp's name came up.

I finally approached Dale about a year before we actually joined forces and started a dialogue, which led to forming an outline of where Dale wanted to go with Protoform. As it turned out, we realized that Dale shared many of the same goals, but he was concerned that he didn't have the time to focus on tool-making. We developed our agreement: Pro-Line would handle the manufacturing issues as well as marketing, sales and administration, and Dale would focus on tool-making and development of the Protoform line. So anyway, we structured a deal, and we've been partners since 1994. Like the Jaco partnership, the Protoform partnership was a success story from day one. All three companies have won multiple national and world championships together, so naturally, we're really pleased with the results at this point.

RCOA: Are touring-car products becoming a major part of your business, or is the off-road line still the bread and butter?

TM: Touring-car tires and accessories are a small portion of our business. But this is quite encouraging because up until recently, the touring-car tire-accessory market was predominantly owned by Japanese R/C manufacturers. I think that all three companies [Pro-Line/Jaco/Protoform] have made their mark in this segment of this industry in a short period of time, on both national and international levels. Our off-road segment is still very strong, and we're optimistic that interest and excitement in this area will continue.

RCOA: So what do you like to do to relax when

you're not working? Are you involved in any hobbies or sporting activities?

TM: My favorite pastime is spending time with my family, weekend get-togethers with our friends and taking my 3-year-old son, Trevor, to Mighty Ducks games [NHL hockey]. I grew up a Whalers' fan in Connecticut and played a bit of ice hockey and a lot of pickup street hockey. I also play on a softball team and occasionally enjoy mountain biking and skiing. I plan to play a little more basketball now that Scott Hughes and Jason Ruona work at Pro-Line; we don't actually have a basketball hoop set up at Pro-Line yet, but Scott and Jason keep hinting that it would be a good idea. My family enjoys going to the mountains and the beach as often as we can; we generally favor outdoor activities. We also spend time with our parents, who live nearby.

RCOA: What does the future hold for Todd Mattson and Pro-Line/Jaco/Protoform?

TM: Well, Pro-Line is committed to the R/C car industry and will continue developing new products and pushing for developments in the tire and accessory segment of our hobby. I look forward to working many more years in the R/C industry and to seeing our industry grow and hopefully receive more exposure. We're fortunate to have great relationships with many R/C manufacturers, and we look forward to maintaining existing relationships and developing new relationships with other manufacturers in the future.

RCOA: Thank you once again, Todd, for allowing us this opportunity to interview you. We wish you and your family continued success.

RACER news

Speed Shop

VCS Micro Shock

Team Associated has just released its new VCS (volume compensating system) Micro Shock that will fit most $\frac{1}{10}$ - and $\frac{1}{12}$ -scale on-road and oval cars without any modification. The VCS shock has a greater volume (it holds more oil) than the typical Delta-style micro shocks found on the most popular on-road pan cars, and this makes it perform more consistently and eliminates the need for frequent rebuilds. The shock body is precision-machined from aircraft-quality aluminum, and the body's exterior is threaded for easy spring-preload adjustment. Inside the shock, you'll find Associated's exclusive volume compensating system, a 7075 aluminum piston, molded Teflon components and a precision-ground, case-hardened steel shaft that is nearly unbendable. Each package of shocks also includes a 4476 Green $\frac{1}{12}$ -scale hard spring and an 8451 Silver $\frac{1}{10}$ -scale soft spring. No dyed-in-the-wool, on-road racer will want to do without this hot new product, so call your hobby shop or Team Associated for more information.

Part no. 4470; \$15.

VCS $\frac{1}{12}$ -scale springs: Black 4.0 (soft)—4475;

Green 6.0 (hard)—4476; \$2 each.

VCS $\frac{1}{10}$ -scale springs: Silver 8.0 (soft)—8451; Blue 10.0 (medium)—8452; Gold 12.0 (hard)—8453; Red 14.0 (extra hard)—8454; \$2 each.



Blue titanium from the Factory Team

Also new from Associated's Factory Team are these awesome-looking blue titanium tie rods that not only look really cool but also are lighter and stronger than the stock steel units that come with most R/C kits. The tie rods are sold in complete kits and are available for all Team Associated vehicles dating back to the RC10 Worlds car. The tie rods are available for all of Team Losi's on- and off-road vehicles (they're perfect for the XX 'CR' Kinwald Edition, with all of its blue-anodized appointments), and Yokomo MX-10 and YR4-M2 owners can also beef up their cars while adding a splash of color to their chassis. Each tie-rod kit includes all the rods necessary for both upper and lower camber and steering rods. To make camber and toe-in/out adjustment much easier, a handy wrench is included. So if you'd like to pick up a set of these cool, new, blue titanium tie rods for your car, call your hobby shop or Associated Electrics. \$9 to \$32.



NEWS FLASH

Team Orion Launches New USA Facility



Meet the boys of Team Orion: Darren Westman, head honcho Philippe Neidhart and Oscar Jansen.

Team Orion has recently expanded into the U.S. market by opening a facility in Irvine, CA. The company will handle much of its manufacturing and distribution via the new U.S. facility. It has introduced a completely new, innovative line of motors that will be available soon in hobby stores across the U.S. as well as in Europe and Japan.

In the U.S., world champion motor designer Darren Westman will oversee motor manufacturing; veteran motor-builder Oscar Jansen will oversee motor manufacturing in Europe. Team Orion hand-wound armatures feature special "pattern wind"—an expensive and precise method of winding that ensures the armature's perfect balance—even before it undergoes the company's epoxy balancing process and provides consistent performance from motor to motor.

"The motors you buy at the hobby shop will be the same motors we give to our team drivers; they are that consistent!" says Westman. Team Orion batteries have won so many world championships that it would take pages to list them; if these motors are anything like the company's batteries, chances are they will capture their fair share of championships. Look for Team Orion motors, batteries, chargers, dischargers and R/C accessories at a hobby shop near you.

RACER TIP OF THE MONTH

**Yokomo R&D Manager
and Team Yokomo/Team
Maxtec Factory Driver
Barry Baker**

This goes out to all novice drivers: remember, you can't win a race in the first lap but you can most certainly lose the race there.

Don't just practice; race. Always remember that no matter how much you practice, racing is still better because you learn to race with other people on the drivers' stand and other cars on the track. I'm not saying, "Don't practice"; I'm saying that entering a race and competing in it will make you a more skillful driver.

RACER PROFILE

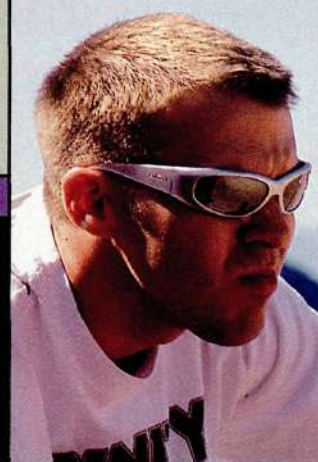
Matt Francis

Most people are familiar with Matt Francis and his always fast red and yellow Losi vehicles because they frequently appear in the pages of this magazine, but few have ever had the pleasure of actually speaking to Matt except to request an autograph or have him pose for a snapshot. Those who know Matt, however, consider him more a friend than a fellow racer. After chatting with Matt at the Reedy International Truck Race of Champions at the Ranch Pit Shop in Pomona, CA, I understand why Matt is so popular; now you can, too.

VITAL SIGNS

Age: 23
Occupation: student; Team Trinity/Team Losi factory team driver
Hometown: Elk Grove, CA
First R/C car: Mugen Bulldog
Favorite racing class: 2WD modified
Favorite track: Hobby Warehouse of Sacramento
Favorite race: IFMAR Off-Road Worlds

Sponsors: Trinity, Team Losi, LRP, Airtronics, MIP, Lunsford, Gadzooks R/C Paint N Style
Hobbies: snowboarding, mountain biking and hanging out with friends
Major victories: IFMAR Electric 2WD Off-Road World Champion, '95-'96, '97 Motor Man Challenge 2WD Champion; '98 2WD Florida Winterchamps Champion; and '98 Motor Man Challenge 4WD Champion.



R/C Car Action: Tell us, Matt, when did you first get involved in the hobby, and how long did it take you to become a regular A-main finalist?
MF: Francis: I got my car in the summer of '86 and didn't race until the following year, when I won my first race. My first big race was the '88 Off-Road Nationals in Antioch, CA, where I finished in the U-main. My first A-main win was at the '91 Cactus Classic, but I think I got lucky. I finally felt like I was a contender after my sixth-place A-main finish at the '92 Off-Road Nats in Dallas.

RCCA: Did your older brother Mark [who is also sponsored by Trinity/Losi] get you involved in racing, or was it the other way around?

MF: Actually, we both became involved in the hobby at around the same time.

RCCA: Did you and Mark get along when you were kids? Did you share your toys?

MF: Like most brothers, I guess we did. I used to beat him up a lot, though, just like in WWF Wrestling—just kidding. I do have a lot of respect for my older brother, I'll have you know.

RCCA: Did you guys go to high school together? Did you look out for each other?

MF: We were two years apart in school but, yeah, he looked after me.

RCCA: So what's it like being a full-time professional R/C racer? What do people say when they first learn your occupation?

MF: "That's cool" is the usual response, but no one really understands just how serious the R/C industry is. People think I just race all the time; they don't realize how hard it is maintaining race-ready vehicles and traveling all the time. Don't get me wrong; I truly enjoy the sport.

RCCA: What are some of your short-term goals?

MF: Getting through college. My major is marketing.

RCCA: Do you want a career in the R/C business?

MF: That's a tough question; maybe, if the right opportunity came up.

RCCA: You used to practice only a couple of times each week; are you practicing more now that you're fully sponsored?

MF: I'm out of town so much in the early part of the year ... this prevents me from practicing. I generally practice or race two to four times a week the rest of the time.

RCCA: What's the toughest part of your job?

MF: Winning! There's a lot of tough competition out there. It's very difficult staying on top.

RCCA: What is your most memorable R/C experience?

MF: By far, winning the '95-'96 IFMAR 2WD Off-Road World Championship at the Yatabe Arena in Japan.

RCCA: I was there, so your answer doesn't surprise me. Now tell me, are the rumors true that you're quite the ladies' man, or is it all just hype?

MF: I wish! I can't seem to find a girlfriend right now, nor am I sure I want one at this time in my life.

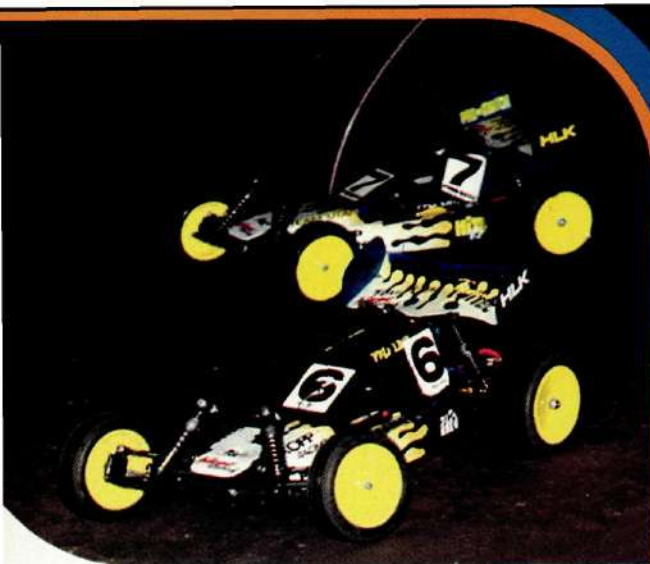
RCCA: So what do you like to do when you're not racing or practicing?

MF: In the winter, I go snowboarding, and in the summer, I ride my Cannondale mountain bike or go boating.

RCCA: How do you plan to take R/C racing up to the next level?

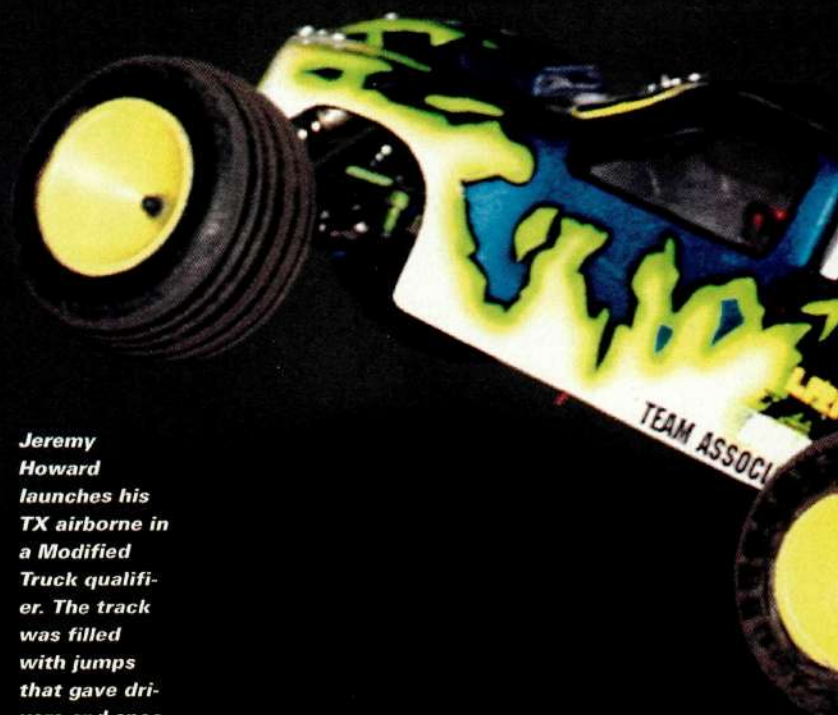
MF: George, if I knew that, I'd already be there.

RCCA: Thanks for your time, Matt. See you at the races.



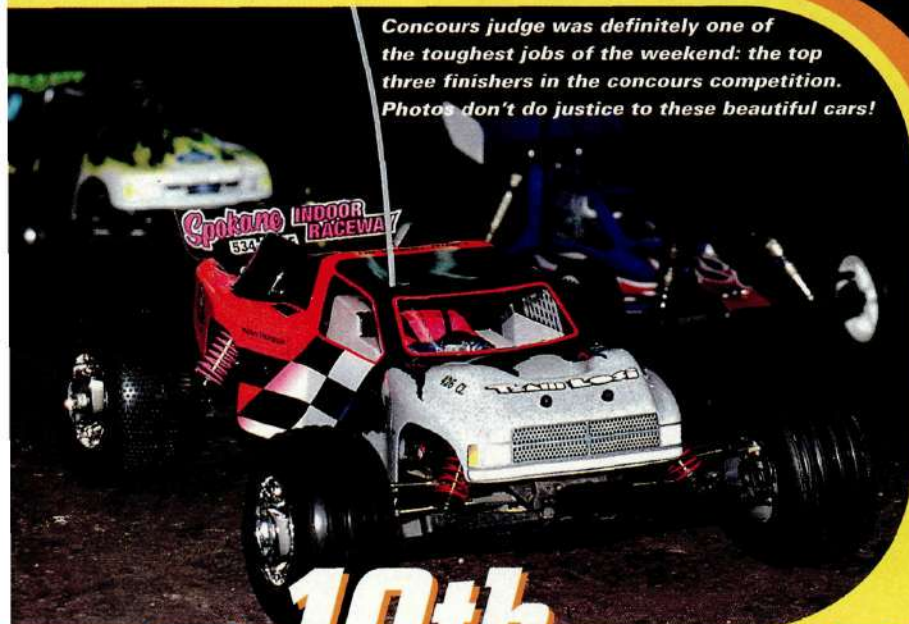
JUST A FEW MONTHS ago, Team Trinity/Losi factory pilot Brian Kinwald told the world where his favorite track is. His number-one racing venue is the Intermountain R/C Raceway in Magna, UT. Accordingly, it didn't take a rocket scientist to figure out that the ensuing 10th Annual April Fools Classic would be an event of giant proportions—and it was. Kinwald, along with 299 drivers, made the trek to Utah to compete in this prestigious race.

Jeremy Howard launches his TX airborne in a Modified Truck qualifier. The track was filled with jumps that gave drivers and spectators alike some great action.



Intermountain

Concours judge was definitely one of the toughest jobs of the weekend: the top three finishers in the concours competition. Photos don't do justice to these beautiful cars!



10th Annual April



Racing Adventure



THE TRACK

Since its inception in 1987, Intermountain R/C Raceway has become one of the nicest tracks in the country. When I was asked to cover the April Fools Classic, I had an idea what to expect. As a past winner of this race back in the dark ages, I was very excited to return. I was shocked, to say the least, when I opened the door and walked into the facility—this place has undergone a big-time transformation.

The changes must be credited to David and Teresa Mott, the track's new owners. Three years ago, this duo purchased the facility and sought to make it of national caliber. With some tireless help from Gizmo Batteries' master track designer Brent Kolan, this Salt Lake City suburb is now on the map.

Intermountain R/C Raceway has hosted 10 consecutive April Fools Classics. Few races in the country have deeper roots than this one, and the high-profile ROAR Off-Road Stock Nationals were held here in 1994. But the staple of the Motts' business is the local club racing scene. They host many fun races every year, and if you happen to show up at one of their weekly races, don't expect to slide your way easily into the A-main! With drivers like Team Associated's Robert Gillespie and speedster Eric Willardson here every week, you'll have your work cut out for you.

The future looks promising, according to the Motts. David and Teresa plan to host as many large events as they can. They would love to have the ROAR or NOR-RCA Nationals here again; and, of course, the annual April Fools Classic will return again next spring.

I guess it's obvious that I really like this place. Everything from the awesome blue-groove surface to the homemade cheeseburgers at the snack bar gets an A+ in their report card. If you're ever in the intermountain region, be sure to drop by the track and say hello. And bring your car or truck, too!

Fools Classic

10th Annual April Fools Classic

Kinwald's Double-X 'CR'. Notice the trick Lexan transponder mount. It keeps unsightly holes in its body to a minimum.



Kinwald preps his Double-X 'CR' for the 2WD Modified A-main. Traction compound was a real benefit on this hard-packed surface.



Brian Kinwald on his way to victory in the 2WD Modified A-main. Notice the funky front tires. Most of the fast guys were cutting a fraction of an inch from the middle of 4WD front tires and gluing them together again to fit on their buggy wheels. Time-consuming duty, but worth it, according to drivers who did it.



Mark Peterson about summed it up with his sticker describing the laws of physics.



Scott Brown catches a laugh between races. The Team Trinity/Losi factory driver made the trek from Tacoma, WA, to compete in the April Fools Classic. He walked away with two second-place and one third-place trophies. Not bad, Scott!



PROFILE: TEAM GILLESPIE

Robert Gillespie is proof that nice guys can go fast. Robert has been racing for as many years as some of his competitors have been alive. An Associated driver since the introduction of the original RC10, he finally achieved a factory ride in 1995; and no one deserves it more! Along with Associated, Robert owes much to Reedy, Pro-Line, HRP, Racers Edge and, most of all, according to Robert, his wife! But that's not the whole story.



Robert's wife of 12 years, Jenny, and five-year-old son Robbie are also avid R/C racers. Jenny and Robbie competed in the same heat this year at the April Fools Classic. Aside from the obvious difficulty of cheering for his favorite racer, Robert must be thrilled to see mom and son trading paint at the racetrack. According to Robert, he just wants Robbie to have fun. "I really don't care if he races or not, as long as he's having a good time," enthuses Robert with a smile. This is one cool family. And much to Jenny's credit, Robert and Jenny celebrated their 12th wedding anniversary at the April Fools Classic this year. His pit space was filled with chargers, batteries and roses! What a compatible couple!

THE RACE

Most of the major race teams were well represented. In addition to the factory superstars, there was a large group of sportsman racers. Competition was as fierce in these classes as it was in the 4WD Modified class. One of the most unique races of the weekend was the Over 40 Masters class. Once on the drivers' stand, these guys drove like six-year-olds on a sugar high. But when the 4-minute Main drew to a close, they quietly gathered again to discuss post-race strategy with the grandkids! This class was lots of fun.

After being plagued with mechanical problems in the first round of qualifying, Kinwald finished the weekend with victories in every class he had entered. There was a lot of talent for him to contend with, but the real race was for second place. He wowed the spectators lap after lap whenever he launched his car or truck into the stratosphere over the infield triple jump. I noticed something about the way Kinwald drives: he only needs a track as wide as his car or truck. We're talking consistent, smooth laps, folks.

The 10th Annual April Fools Classic, like the nine before it, was a tremendous success. The racing action was cooking right along with the burgers, and the staff and crew at Intermountain R/C Raceway should receive a well-deserved high-five. Fellow racers, the April Fools Classic is one race you won't want to miss, so grab a pen right now and mark it on your 1999 calendars. The only real April fools will be those who will miss this event next year. See you in Utah!

2WD MODIFIED

POS.	DRIVER	CHASSIS	MOTOR	ESC	TIRES(F/R)
1	Brian Kinwald	XX 'CR'	Trinity 13x6	Novak Cyclone	Pro-Line Hole Shot/Square Fuzzies
2	Scott Brown	XX 'CR'	Trinity 12x5	Novak Cyclone	Pro-Line Square Fuzzies
3	Eric Willardson	XX 'CR'	Peak 12x3	Novak Cyclone	Pro-Line Hole Shot/Square Fuzzies

MODIFIED TRUCK

1	Brian Kinwald	XX-T 'CR'	Trinity 12x2	Novak Cyclone	Pro-Line Hole Shot
2	Scott Brown	XX-T 'CR'	Trinity 12x5	Novak Cyclone	Pro-Line Square Fuzzies
3	Jimmy Babcock	XX-T 'CR'	Peak 11x6	LRP IPC V6	Team Losi Silver Directional/Pro-Line Square Fuzzies

4WD MODIFIED

1	Matt Francis	XX-4	Trinity 12x2	LRP IPC V6	Team Losi Sprint
2	Scott Brown	XX-4	Trinity 12x5	Novak Cyclone	Pro-Line Square Fuzzies
3	Eric Willardson	XX-4	Peak 12x2	Novak Cyclone	Pro-Line Hole Shot

2WD PRO STOCK

1	Jimmy Babcock	XX 'CR'	Peak	Novak Cyclone	Pro-Line Hole Shot/Square Fuzzies
2	Bryce Beaver	RC10B3	Reedy	LRP ICP V6	Pro-Line 2.2/Square Fuzzies
3	Richie Parkhurst	XX 'CR'	GM	GM ASP	Pro-Line Hole Shot

PRO STOCK TRUCK

1	Brian Westerman	XX-T 'CR'	Trinity	Tekin G12C	Team Losi Silver Directional/Pro-Line Square Fuzzies
2	Charlie Albrecht	XX-T 'CR'	Peak	Novak Cyclone	Team Losi Silver Directional/Pro-Line Square Fuzzies
3	Jeremy Kopp	XX-T 'CR'	Bennett	Hitec HFX	Pro-Line Square Fuzzies

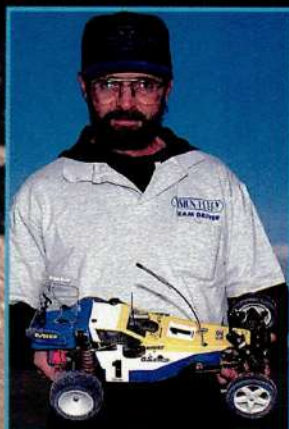
Silver State



Nitro Challenge

by George M. Gonzalez

Gus Wood—1/10-scale
Buggy A-main champ.



"C ould it be that
the '98 Silver
State Nitro

Challenge, one of

the largest non-sanctioned gas off-
road races, has been canceled?" That

was the question on my mind

as I drove through Death

Valley on I-15 at 11:15

p.m. in what seemed

like a monsoon. Heavy

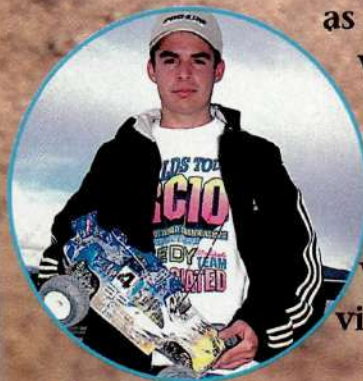
rain and hazardous

wind cut

visibility to a few feet on
this dark desert highway.

In the dis-
tance, Las
Vegas, NV,
lit up the
horizon

like a beacon. My desti-
nation was coming

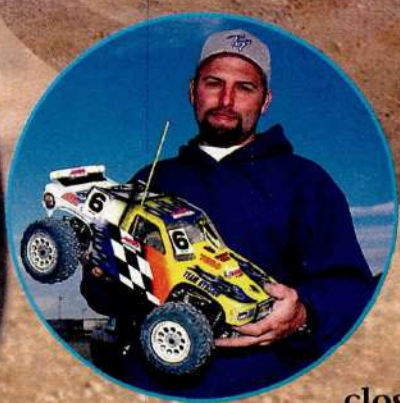


Travis Amezcua took a
DNS in both qualifiers and
earned himself a position
in the J-main. Then he was
bumped all the way up to
the A-main and finished
fourth. It took him nearly
5 hours, but he did it.



Goin' for Gold!

PHOTOS BY GEORGE GONZALEZ



Mike Dunn— $\frac{1}{8}$ -scale Truck Grand champion—with his thoroughly broken-in Kyosho Inferno ST.



closer, and I knew that the answer to my question lay up ahead.

Before I checked into my hotel, I decided to find the track so I'd have a better idea of what to expect in the morning. As I pulled in to the Las Vegas Motor Speedway (a full-scale racing facility), I found the R/C track just off to the left of the motorcycle supercross track; the drivers' stand with the Kyosho banners was a dead giveaway.



Mark Pavidis— $\frac{1}{8}$ -scale Buggy and $\frac{1}{10}$ -scale Truck A-main champion. I bet he couldn't wait to get back home.



Jason Ashton (left) and his pit man, **Rocky Hardcastle**. Running Rocky's Mugen, Jason took the TQ Truck honors.



If nature had been a little more cooperative, the racers would have competed in four 15-minute qualifying rounds to determine which eight out of 10 would automatically make the 60-minute A-main Grand Final in each racing class. The remaining two A-main drivers would have to make the A-main the hard way (more on this later).

A racer's best three qualifying times would have then been averaged to determine a score that would be used to sort out the qualifying order or Main event standings. A driver's worst qualifier would be thrown out and used only in a tie. As you know, the racers competed in only two qualifiers, so the qualifying order was determined by a driver's best time from those two qualifiers.

Silver State Racing Venue

The remaining two A-main drivers were actually the first- and second-place winners from the B-main. The top two drivers from each Main were "bumped up" to the next Main. This meant that a driver who qualified in eighth place in the C-main could get bumped up to the B-main if he or she finished in second place or better.

From there, a second- or first-place finish in the B-main would move that driver, who originated in the C-main, up to the A-main. The better you qualified, the fewer bump-ups you had to face.

With only two qualifiers determining the Mains, there was a lot of bumping up. The two most "bumped-up" racers were Team



And they're off! It's the start of the 1/8-scale Truck A-main.

Associated/Team Mugen Seiki drivers, Mark Pavidis and Travis Amezcua. In the 1/8 scale, Pavidis only managed to put in a few laps between his two qualifiers; this put him in the I-main in 66th place—heaven forbid! Pavidis' faith and talents didn't falter, however, and he finished in first place in every Main up to the B-main, which he finished second behind Kris Moore. Pavidis ended up winning the 60-minute A-main after racing for more than 4 hours straight! Travis Amezcua finished in 77th place after failing to start both of his qualifying heats. Amezcua ended up in the J-main, but worked his way up to the A-main after starting with absolutely nothing. Amezcua finished in fourth place in the A-main after racing for over 5 hours—simply amazing!

SILVER STATE NITRO CHALLENGE

At the covered pit area, I found signs of recent activity, but the place was deserted. I drove off toward the left of the pit area and found what appeared to be a track. Yes; there was definitely a track underneath what looked like a thousand gallons of water and mud. I guess my question wouldn't be answered until the morning, but things looked pretty grim.

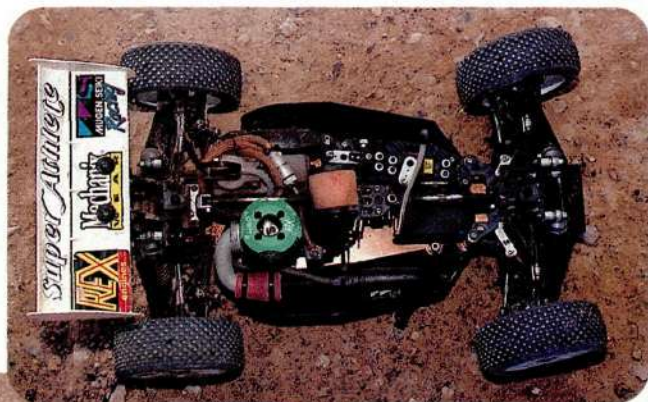
HIT THE SLOT MACHINES!

• **Saturday.** The next morning, a hint of sunshine peeking through nasty-looking gray clouds brought the hope of afternoon racing. As I pulled into the entrance of the Las Vegas Motor Speedway, I found the gates closed and access to the R/C

track denied. "I guess the event was canceled after all," I thought. Back to my hotel to pack.

At the hotel, I ran into fellow racer Doug Hatfield, who gave me the run-down on what was going on. At last, someone with answers!

The event was only delayed. Racers had completed one of the four scheduled qualifiers on Friday, but the track was closed all day Saturday. The plan was to hold one more round of qualifying on Sunday then proceed directly to



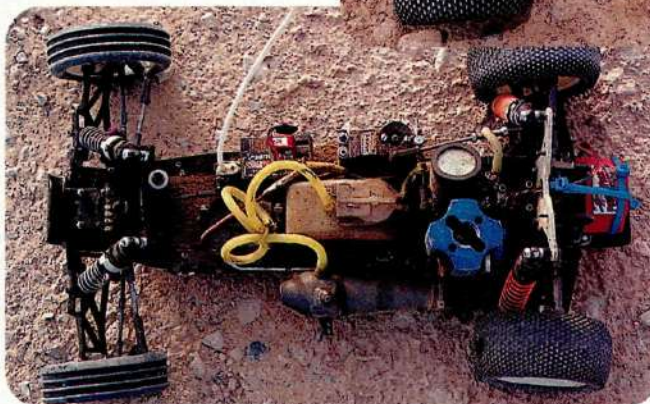
▲ **Mark Pavidis** raced his Mugen Seiki Super Athlete for over four hours straight before winning the 60-minute A-main Grand Final. It still looks fresh—amazing.



▲ **Mike Dunn's** A-main-winning Kyosho Inferno ST truck—a pit bull!



Mark Pavidis' ▶ A-main-winning Associated RC10GT.



◀ **I'm not sure what this is, but it's Gus Wood's A-main-winning scratch-built 1/10-scale nitro buggy. Gus claims that the front end is all Losi, the rear end is all Associated and the middle part Well, even he can't figure that part out.**



Silver State Nitro Challenge Winners

1/8 Buggy

Fin.	Qual.	Driver	Chassis	Engine	Pipe	Fuel	Radio	Tires(F/R)
1	66	Mark Pavidis	Mugen	Rex	Rex	O'Donnell	Airtronics	Pro-Line
2	6	Magnus Amilon	Kyosho MP-5	RB Concept	NR 63 Extra	O'Donnell	Futaba	Pro-Line
3	2	Travis Amezcua	Mugen	Paris	Mugen	NA	Airtronics	Pro-Line
4	5	Doug von Mosch	Mugen	Rex	Mugen	O'Donnell	Airtronics	Pro-Line
5	7	Dave Henry	Kyosho MP-5	O.S. RZ-B	AL 650	FSR	Futaba	Kyosho
6	10	Kris Moore	Kyosho MP-5	Paris	Paris	O'Donnell	KO Propo	Kyosho
7	3	Yuuichi Kanai	Kyosho MP-5	R&B C3 Buggy	Kyosho	FSR Buggy Nitro	Sanwa	Kyosho
8	4	Richard Saxton	Mugen	Picco	Mugen	O'Donnell	JR	Pro-Line
9	8	Peter Head	Kyosho MP-5	O.S.	AL 650	FSR 30%	KO	Kyosho
10	1	Jason Ashton	Mugen	Paris	Paris	O'Donnell	Airtronics	Pro-Line

1/10 Buggy

1	NA	Guss Wood	NA	NA	NA	NA	NA	NA
2	1	Ron Bechard	ESM Losi XX	O.S. O'Donnell	NA	O'Donnell	Airtronics M8	Bow Ties
3	NA	Devin Gibson	NA	NA	NA	NA	NA	NA

1/8 Truck

1	2	Mike Dunn	Kyosho MP-5	OS RB	Paris	O'Donnell 2	KO/Propo	Kyosho
2	4	Derek Furutani	FTD	Rex	Rex	FSR	Airtronics M8	Kyosho
3	3	Greg Waller	Kyosho MP-5	Top	Top 086	O'Donnell	Airtronics 3PS	Kyosho
4	1	Dave Henry	FTD Truck	O.S.	A: 650	FSR 30%	Futaba 3PJ	Tires by Eddy
5	10	Doug Hatfield	OFNA	Picco	Omega 081	O'Donnell	Futaba	Kyosho
6	7	Eddy Wong	Kyosho MP-5	O.S. RZB	Paris 650	FSR 3	KO Propo	Tires by Eddy
7	5	Eddie Payne	Kyosho MP-5	Rex CX 21 5B	Omega 081	Blue Thunder	Futaba PJ	Kyosho
8	8	Richard Harding	Kyosho MP-5	O.S.	Paris 650	FSR	Airtronics	Kyosho
9	9	Patrick Posadas	Kyosho MP-5	Top PT21	Omega 081	Home mix	Futaba 3PD	Kyosho
10	6	Tim Long	Kyosho MP-5	O.S. RZB	AL 650	FSR 20%	Sanwa	Kyosho

1/10 Truck

1	5	Mark Pavidis	RC10GT	O.S. CZV	Associated	O'Donnell	Airtronics M8	Pro-Line
2	3	Jon Anderson	Losi GTX	O'Donnell	O.S.	O'Donnell	Futaba 3PJ	Losi Gold
3	9	Austin Dvorak	Associated	OS	Associated	O'Donnell 2	Airtronics 3P	Pro-Line
4	10	Travis Amezcua	Associated	O.S.	Associated	NA	Airtronics	Pro-Line
5	2	Billy Easton	RC10 GT	O.S. CZ-Z 12	Associated	O'Donnell	Futaba 3PJ	Pro-Line
6	5	Matt Ledger	RC10 GT	O.S. CV	Associated	Dynamite	JR	Pro-Line
7	6	Richard Saxton	Associated GT	O.S.	Associated	O'Donnell	JR	Pro-Line
8	8	Chad Bradley	RC10 GT	RBW	Associated	RBW	Hitec	Pro-Line
9	7	Doug von Mosch	Associated	O.S.	Associated	O'Donnell	Airtronics	Pro-Line
10	1	Jimmy Jacobson	Associated	O.S. Max	Associated	O'Donnell	KO Propo	Pro-Line

the Mains. This meant that the drivers only had one more chance to put in their best run. Naturally, this decision was controversial. The racers argued that they used the first round of qualifying (sort of) as a controlled practice heat and that they were counting on three more chances to improve their scores. Even though the arguments were compelling, the time factor overshadowed all arguments. In the end, most racers didn't mind; after all, they were in Las Vegas!

SUNSHINE AT LAST

• **Sunday.** The sun was out for most of Saturday afternoon, and by Sunday morning, the track was in decent shape again. "Decent shape" doesn't describe the condition of some of the racers who stayed up all night walking "the strip," one casino at a time, though.

The final qualifier went without a hitch, and by noon, the Mains had been posted for all to see. Soon afterward, the sound of singing nitro engines filled the air as drivers used the limited time to practice.

QUALIFYING

• **1/8-scale Buggy.** Over 77 racers competed. Team Associated driver Jason Ashton took the TQ honors after crossing the line less than 1/2 second ahead of Team Associated/Team Mugen Seiki driver Travis Amezcua. Amazingly, this was the first time Ashton had raced an 1/8-scale gas off-road vehicle, and he was driving a borrowed Mugen Super Athlete that belongs to his friend and pit man Rocky Hardcastle. Jason is an accomplished 1/10-scale electric driver, so we could hardly

SILVER STATE NITRO CHALLENGE

consider his qualifying position to be beginners' luck.

Team Kyosho driver Kanai Yuuichi traveled all the way from Japan to compete and qualified in third. Team Associated/Team Mugen Seiki driver Richard Saxton, Team Mugen Seiki driver Doug Vonmosch, Team Kyosho driver Magnus Amilor, Team Kyosho driver Dave Henry and Team Kyosho driver Peter Head finished from fourth to eighth, respectively and were assured a spot on the A-main grid. The remaining two A-main finalists would be determined after the B-main.

• **1/8-scale Truck.** Although only 14 drivers competed, the action was just as exciting as in the other classes. FTD driver Dave Henry, Race Prep/Kyosho driver Mike Dunn and Kyosho driver Greg Waller were the only drivers to turn 11 laps, and they qualified first through third, respectively. Kyosho/FTD driver Derek Furutani, OFNA driver Eddie Payne, Kyosho driver Tim Long, Kyosho driver Eddy Wong and Richard Harding finished fourth through eighth in that order to secure a spot on the drivers' stand during the A-main.

• **1/10-scale Truck.** This was the most popular class and had more than 81 contestants. Team Associated drivers Jimmy Jacobson and Billy Easton and Team Losi driver Jon Anderson all posted fast 10-lap runs to qualify first through third. Mark Pavidis, Team Associated driver Matt Ledger, Richard Saxton and Doug



Kyosho driver Kris Moore works on his 1/8-scale buggy. It obviously paid off: he was an A-main finalist.

Vonmosch finished fourth through eighth and qualified for the A-main without having to be bumped up from one of the higher Mains.

• **1/10-scale Buggy.** Well, only four guys showed up to compete in this class. If only I had known that the odds of winning were so good, I would have taken along my Traxxas Nitro Buggy. Ron Bechard ended up as TQ and was one lap faster than his nearest competitor, Earl Silva. The other two drivers took a DNS and still made the A-main. Go figure.

THE MAINS

• **1/8-scale Buggy (60-minute Main).** Although Mark Pavidis qualified poorly and ended up in the I-main, he finished in first place in Mains "I" through "C" and in second in the B-main; he was then bumped up with the rest of the A-main finalists. Pavidis raced for over 3 hours before stepping up on the drivers' stand for the ninth time to face the 60-minute A-main Grand Final.

Team Kyosho driver Kris Moore was the other driver bumped up to the A-main, but he started from the B-main, so he was a lot less stressed than Pavidis. After the 60-minute Main, Pavidis had 92 laps and won the event. No doubt, Pavidis is the "Iron Man" of R/C. Magnus Amilor crossed the line with 90 laps to secure second, and Travis Amezcua finished in third after completing 89 laps.

THE ULTIMATE PIT SP



When you pull up the Team Serpent Network web site you pull into gas racing's ultimate pit space. Browse the on-line version of our 80-page, 200-photo Tech Book – a virtual gas car bible that puts 20 years of tuning know-how at your fingertips. Join the Cyber-Pit, a unique interactive web page where racers from around the world share tech information. Download our exclusive START datalogging software...for free. Or read the latest tuning tips in columns by the current World T.Q., the ROAR Champion, and other experts. TSN – get it dialed up, and get your car dialed in.



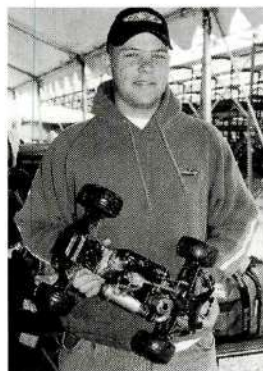
• **1/8-scale Truck** (20-minute Main). Mike Dunn was the happy first-place champion in this class after posting a 29/20:50.74. Derek Furutani was right behind with a 28/20:03.03, and Greg Waller rounded up the third spot with his 28/20:10.70 final time.

• **1/10-scale Truck** (45-minute Main). Mark Pavidis wasn't as tired after his 1/8-scale endurance adventure as people had thought he might be. Travis Amezcua, who was bumped up all the way from the J-main and had raced for more than 5 hours straight, however, was dead tired, to put it mildly.

Pavidis, Jon Anderson, Team Associated driver Austin Dvorak and Amezcua battled it out for the entire 45 minutes, and no one would have been able to guess the outcome with all the position swapping and pit stops that went on. After the buzzer had sounded, Pavidis crossed the line first with a 63/45:05.12; Anderson crossed moments later with a 63/45:08.19; and Dvorak crossed with a 63/45:26.41 to claim third. Amezcua, who was surely on the verge of

exhaustion, ended up with a 63/45:38.47 to finish in fourth place.

• **1/10-scale Buggy** (15-minute Main). Gus Wood and Ron Bechard raced head to toe with their scratch-built 2WD nitro buggies. Devin Gibson ran into trouble at around the halfway point and found him-



Mud patrol. *Greg Degani and Chad Bradley were ready for the mud. To keep their electrical equipment dry, they sealed their trucks with duct tape, electrical tape and aluminum foil. The track conditions improved greatly, so the driver's efforts were unfounded.*

self out of the race. Meanwhile, Wood and Bechard continued to race diligently until the end-of-race tone sounded.

Toward the end, Wood turned it on and finished a full lap ahead of Bechard to take the win. Naturally, Bechard secured second. See, if I had raced, I most definitely would have taken home a trophy. Then I would have been able to brag that I finished third at the Silver State Nitro Challenge!

WRAPPING IT UP

The Silver State Nitro Challenge was exciting, and you didn't have to be an R/C racer to enjoy watching it. These vehicles are loud, fast and catch a lot of air; they truly represent the extreme side of R/C.

All of the racers who competed did their part to ensure that the action would be something to remember; and I'm sure that most of the contestants went home with cool memories.

We congratulate Mark Pavidis, Doug Henry and Guss Wood for their fantastic performances and thank Kyosho, Mugen Seiki, Associated, Team Losi, Lunsford, Pro-Line, O'Donnell, Paris Racing, FTD Products, Ace Hardware, O.S. Engines, Rex, Thunder Tiger, Ace Hobby and Just Kiddin' Playwear for their generous sponsorship. Until next time ■

RACE IS IN CYBERSPACE



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Serpent
EXCITEMENT IN THE FAST LANE

Need to know what's new? What works well and what doesn't? This section is devoted to objective reviews of all R/C car accessory items. From gears and wrenches to motor brushes and shock springs; if you can use it with your R/C vehicle, you'll find it critiqued on these pages.



150
Hitec CG-330
Peak Charger



152
LRP
Bullet Reversing
Speed Control



156
GM-Racing
V12 ESC

HITEC

CG-330 Peak Charger

Charge up to four packs!

Hitec*, a company that has gained tremendous respect in R/C racing circles, has just introduced a new line of battery chargers that are well suited to sport and racing applications. The versatile, economical CG-330 and CG-335 may be used with almost every type of rechargeable battery known to R/C car enthusiasts.

The CG-330 peak-detection charger:

- can charge 4 to 24 cells at the same time—far more than the typical 8- to 10-cell limit for most chargers;
- has a terminal for quick-charging single-cell glow-plug batteries;

The CG-335 has the above features, plus:

- a digital display;
- an additional charging port exclusively for charging 4-cell receiver battery packs.

According to Hitec, both chargers are capable of:

- charging a single pack of up to 24 cells, or
- charging up to four, 6-cell packs (24 cells).

MANUFACTURER'S SPECIFICATIONS

Power source:	9 to 15 volts DC—minimum 10A
Charge type:	pulse peak w/automatic trickle
Charge rate:	0.5 to 5.5 amps; 1.1 amp for glow-plug adapter
Max. charge time:	65 minutes
No. of cells:	4 to 24; single glow-plug adapter
List price:	\$109 (CG-330), \$149 (CG-335)

When charging more than one pack, you must connect them in series. I'll explain. To connect packs in series, you first attach the positive lead from the battery charger to the positive lead of the first pack. Then, instead of connecting the negative leads in a similar way (parallel connection), the negative lead of the first pack is connected to the positive lead of the second pack. The negative lead of the second pack is then connected to the positive lead of the third pack, then ... well you get the idea. However many packs are charged, they must be strung together in a sort of daisy chain. The easiest way to accomplish this type of connection is with Sermos connectors or with other, similar, modular connectors on which the positive and negative leads can be separated and connected to other packs.

FEATURES

- **Boosted charging.** This technology lets you charge up to 24 cells from a 12V source. Typically, a peak-charger's cell capacity is limited by the voltage of its power supply. For example, if the power supplied is 12 volts, then it can effectively charge only 8 cells (8 cells x 1.4 volts per cell = 11.2 volts). Remember that although a C-cell Ni-Cd cell is rated at 1.2 volts, when it's being charged, its voltage can go up to around 1.4 volts. When charging 24 cells,



the CG-330's boosted charging technology actually allows it to keep charging until the supply voltage drops as low as 9 volts!

- **Initial cutoff error override.** This feature prevents false peaking. It's very common for a completely discharged battery's voltage to fluctuate considerably during the first few minutes of a charge cycle. False-peak protection simply prevents the charger from mistakenly identifying a "peak" and shutting off prematurely before the cell has been fully charged.

- **Low battery input voltage.** The CG-330 has an indicator to let you know when the input battery voltage is too low. It can function with as few as 9 volts, but the instructions caution against allowing the supply voltage to drop below 9 volts. When it drops below that level, you risk damaging the supply battery.

- **Input battery polarity protection.** Excited racers and sport enthusiasts may incorrectly hook the charger up to the supply battery (wrong polarity). The CG-330's circuitry prevents it from being damaged if it's improperly connected.

- **Output battery polarity protection.** If the battery is hooked up incorrectly, the charger won't activate; its LED will simply continue to flash, even though the "start" button has been pushed.

- **Charging port short protection.** If the charging ports on the side of the battery are shorted out, the charger's indicator light will blink to indicate there's a problem.

- **Adjustable charge rate.** The CG-330's charge rate—and that of the CG-335—is adjustable from 0.5 to 5.5 amps, a range that allows the CG chargers to accommodate the entire spectrum of Ni-Cds used for R/C cars.

FINAL ANALYSIS

These CG chargers are not linear-monster-zapper-triple-flip peak chargers designed to get that extra 4 seconds of run time out of a battery pack. They are economical and versatile MOSFET pulse chargers that, because they have a wide application, will keep you more on the track than on the charging table. They're compact enough to easily fit in the average toolbox and are very easy to operate.

—Steve Pond

LIKES

- Multi-pack charging capability.
- Glow-plug adapter charging.
- Very easy to use.

DISLIKES

- No battery-charging leads included.
- No display on CG-330.

LRP

Bullet Reversing Speed Control

Adjustable, reversible power

I've collected quite a few racing speed controls over the years. I have high-frequency ESCs, programmable ESCs, micro ESCs You name it; I have it. These high-performance boxes fail me, however, when it's time to just goof around on the track. Since they are racing speed controls, they don't have reverse. If the car gets stuck, I have to climb off the drivers' stand, mosey across the track and boot it off the boards. At that point, I don't care how efficient or adjustable my ESC is; I just wish my car could go backwards!

With that in mind, I've installed a new reversing ESC in one of my favorite run-for-fun cars—Tamiya's Blazing Star 4WD buggy. The ESC in question is the Bullet from LRP—the same company that makes the killer IPC V6 controller. Has some of that V6 performance found its way into the Bullet? We'll see.

FEATURES

As LRP's best reversing ESC, the Bullet has some pretty cool features. Here are the biggies:

- **Intelligent brake control (IBC).** This gives the Bullet full braking control without activating reverse; reverse kicks in only after the car has come to a complete stop, no matter how long the trigger is held in the full brake position. The Bullet allows 5 seconds of reverse operation and then returns to neutral.
- **Adjustable power control (APC).** LRP parlance for the Bullet's current limiter. However, it might be said that the APC doesn't really limit current but it controls current; even at its lowest setting, the APC will not inhibit top speed.
- **Intelligent temperature protection.** If the Bullet overheats, it will shut down (although it will still power the receiver and steering servo).
- **High-frequency operation.** Although not as stratospherically high as some racing ESCs, the Bullet switches at a respectable 2500Hz.

The Bullet also features push-button setup and an extra wire for FET servos that require an external lead. Heat sinks, capacitors, servo tape, zip-ties, a setup tool and servo plugs (JR, Futaba, Airtronics) are also included, and the Bullet is equipped with bullet connectors for the motor and a Tamiya plug for the battery.

INSTALLATION AND SETUP

If you're dropping the Bullet into an entry-level car, simply tape it down and plug in the wires—no soldering needed. My first step was to snip off the Tamiya-type battery connector in favor of a Dean's plug (to match my packs). I also snipped off the bullet connectors and soldered extensions to the leads so I could hard-wire my motor. With a bit of servo tape and a



quick touch from the soldering iron, the Bullet was installed in my Tamiya Blazing Star buggy and ready to accept my radio settings. Push-button setup combined with a red/green LED makes this simple: one press of the setup button locks in neutral; pull the throttle trigger and hit the button again to set full throttle; then push the button once more with the trigger in full reverse, and that's it. The Bullet is ready to go.

PERFORMANCE

Tamiya's Blazing Star can really give an ESC a workout, especially when it's running a modified motor. I equipped the car with a Reedy Conquest 15-turn jobber, but LRP's instructions indicate that motors with as few as nine turns can be used safely—pretty hairy. On pavement, with the APC cranked up to full power, the Bullet proved to be a smooth performer.

It would be nice if the APC could be set without a tool (the included plastic tool is used to turn the recessed APC pot), and some visual indication of what the setting is would be helpful, although these are not critical omissions. When it was dialed down to a low setting, I could feel the APC feeding in more power to the motor as it neared full throttle; there are slight "blips" in the powerband, almost as though the Bullet is shifting gears. The lowest setting caused the Blazing Star to creep away

slowly without spinning out, even on sandy asphalt. However, the Bullet didn't hold back on top speed, regardless of the APC setting. Pretty cool.

Of course, you have to slow down sometime. The Bullet's intelligent braking control system works as promised; whether I was jamming on the brakes or coming to a long, gradual stop, reverse never kicked in until the car had stopped completely. Once the car had stopped, however, reverse was available immediately—no annoying delay.

Reverse throttle control was also quite smooth. Five seconds' worth of reverse proved to be plenty, and there's always more backwards available if you tap forward throttle then hit reverse again. Although reverse cannot be locked out for racing, the IBC system should prevent reverse from engaging in any competition situation; after all, how often do you need to come to a full stop during a race? If you intend to race occasionally with the Bullet, make sure it's OK with the other racers.

I wanted to give the Bullet a more rigorous test than pavement running could provide, so I ran the Blazing Star up and down a soccer field for a few packs. Running on grass is extremely hard on motors and ESCs, but the Bullet hung in there. The heat sinks warmed up, but didn't get hot—even with three packs run through the car without a break. The motor was smokin' hot, so I knew the Bullet was working hard.

FINAL THOUGHTS

The LRP Bullet is a solid, reliable reversing ESC. Thanks to the supplied connectors, beginners will find it easy to install, and the intelligent brake control feature will spare their gearboxes from tranny-dropping mayhem. More experienced hobbyists will appreciate the unit's adjustability and performance, particularly on slippery surfaces where the adjustable power control really shines.

—Peter Vieira

LIKES

- Easy setup and installation.
- Current limiter does not inhibit top speed.

DISLIKES

- Tool required to adjust current limiter.
- No markings to indicate the current limiter setting.

MANUFACTURER'S SPECIFICATIONS

Cells: 4 to 7
BEC: 5V
Resistance (ohm)*: 0.0045
Forward current: 260 amps
Frequency: 2500Hz
Dimensions**: 1.6x1.6x0.88 in.
Sug. motor limit: 9-turn (6 cells)

* Transistor rating at 25°C junction temperature

** Without heat sinks

GM-RACING

V12 ESC

Smaller is better

Over time, speed controls have changed from being huge, heat-retaining, inefficient boxes to being small, lightweight, cool-running units. GM-Racing* has jumped on the miniature, high-frequency bandwagon and introduced its new V12 speedo that, according to GM, is the first ESC in the world to incorporate surface-mounted V-FET technology. This pint-size power regulator not only puts out excellent performance, but it is also packed with cool racing features. Read on, and we'll give you the lowdown on this tiny but mighty electronic wonder.

FEATURES

The V12 measures 1.26x1.024 inches and weighs 19 grams (without the power wires and capacitor installed). The power wires are soldered directly to the circuit-board tabs that protrude from its side; this eliminates the need for a soldering post, and that cuts down on weight. Be careful when you solder on the power wires because excessive heat can damage the circuit board. Like many racing-oriented ESCs, the V12 includes a separate FET wire—in case you want to install a high-performance, FET-boosted servo.

The V12 is equipped with quick-tune setup controls that allow you to easily calibrate it to your radio system. Although slightly more complicated than the one-touch setups found on other competitive ESCs, the V12 can be calibrated to your radio system in less than 10 seconds once you are familiar with the process. After you have stored the settings in memory, you can leave the additional tuning functions at their default setting and you're ready to race. Of course, you can program in your own parameters right away with the quick-tune feature and start experimenting with the ESC's various tuning options.

The V12's exclusive Turbo function is actually a "smart" current limiter that turns on and off as needed to allow racers to cope with both the fast and slow sections of the track. The current limiter is adjusted by rotating the "LIM" pot clockwise or counterclockwise. Turning the adjustment pot clockwise increases the current that flows to the motor; turning it counterclockwise decreases the current.

Pretty basic stuff, huh? Well, not really. The V12 allows racers to set the current limiter for the slower sections of the track (such as the corners and switchback turns). When you hit the fast sections (straightaways and sweepers), the current limiter will turn off to give maximum power. The moment you let off the throttle again to negotiate a corner, the current limiter will return to the setting you selected. Neat, huh? In addition, you can disable the Turbo function or fine-tune it to suit your particular needs.

The quick-start feature is another innovative function. When selected, it will disengage the current limiter to provide full power at the start, but the moment you let off the throttle, the ESC will return to the setting you selected. GM recommends that you take advantage of this feature during the final round of competition when you need all of the power at the start of the race.

The brake minimum and maximum can also be set to regulate the amount of initial braking (brake minimum) as well as the brak-



ing at the end of the throw (brake maximum). Track conditions and your driving style will dictate how you set the brakes, but you'll be able to set them either to gently apply the brake or to lock the wheels.

The auto-brake function is similar to a drag-brake function. When you let off the throttle (the trigger is returned to neutral), the brakes will come on according to where you set the brake minimum. This helps racers cope with tight, twisty tracks on which immediate throttle and brake control are necessary.

The V12's operating frequency can also be altered from 2 to 4kHz to fine-tune the smoothness of the throttle to suit track conditions and your driving style. Generally speaking, higher frequencies are handy for slippery tracks, while slower frequencies are useful for high-bite tracks.

ON TRACK

I dropped the new V12 into my HPI RS4 Pro and soldered up the supplied 14-gauge wire and power capacitor. The compact V12 slipped into the chassis with plenty of room to spare. Thanks to the quick-tune feature, getting the V12 calibrated to my radio was a snap. Then I moved on to adjusting the current limiter. The instructions provide suggestions for many racing applications, and I found this to be particularly helpful. I turned the limiter down to 50 amps to suit the dusty track. I left the Turbo function, the brake min/max and the brake auto all in their default locations. I did disable the quick-start mode, however, because the track was too slippery, and full power at the start wasn't really an advantage. I yanked on the throttle and the car took off quickly and evenly. Its top speed was incredible, yet I had control at all times. At first, I thought that I wouldn't notice whether the Turbo function was actually working, but it was obvious that it was. Whenever I goosed the throttle, the car accelerated like hellfire, but the moment I let off the gas and then reapplied the throttle, I felt the current limiter doing its job. The throttle was extremely responsive and smooth. Very impressive! The GM V12 ESC has found a permanent home in my RS4 and will see its fair share of racing.

—Greg Vogel

LIKES

- Compact size.
- Super-smooth performance.
- Packed with racing features.

DISLIKES

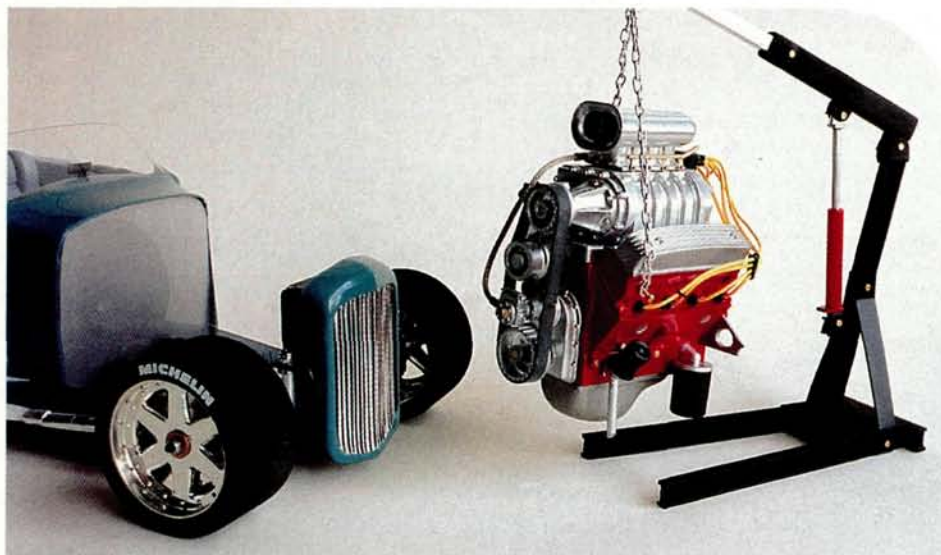
- Inexperienced modelers may damage the circuit board when soldering on the power wires if they're not careful.
- Instructions could be clearer.

HOW TO Detail Parma's small-block Chevy

by Joseph Ringeisen

There's no question that the small-block Chevy engine is one of the most popular engines of all time; a wide variety of parts are available to modify the small block, and, as anyone who has ever modified one can attest, the parts are relatively inexpensive. Additionally, the engine has a basic design that's easy to become familiar with. All of these attributes have contributed to the longevity of the small-block engine family, which has lasted for decades.

Parma* offers a 1/10-scale model of this evergreen engine as a companion piece to the popular Parma Hemi engine. The kit includes two complete engines that can be assembled in a variety of configurations, including a dual-engine setup that would look great on a pulling truck or monster truck. Being kind of a scale-detailing nut, I had to have one. Follow along while I cover some of the tricks I used to build a trick small-block.



All dressed up and ready to rock, the Parma small-block Chevy engine waits to be dropped into a project car.

ABOUT THE KIT

Building Parma's kit isn't really difficult—time-consuming, yes; difficult, no. You'll need paint and brushes, glue, and an X-Acto knife. The type of glue that you use is your choice, but I chose CA cement, mainly because it dries fast. The only problem with CA is that it can fog up a shiny surface. That's not too much of a problem, since there's no chrome in the Parma kit, but CA can also fog up painted areas. Just be careful, and test on scrap plastic before you commit yourself.

The instructions cover basic assembly well. I will warn you about one thing, though: you need to be very careful about which parts you use where because the kit includes parts to build two complete engines.

While this sounds very generous, it can be a little confusing if

you aren't careful. This is especially true when assembling the engine blocks. Before you go tearing into the kit, sit down and figure out exactly what you want the engine to look like when you've finished.

COLOR SELECTION

As with any plastic model, you should paint the individual pieces before you put them together. Use your imagination when painting the engine; my choice for the engine block, cylinder heads and backing plate is red, but if you're going for more of a "factory" look, orange would probably be the best choice. I chose "steel" paint for the oil pan and bell housing, but you can also paint them the same color as the block and the heads. The blower, blower scoop and valve covers are finished with Testor's "chrome" paint. The oil filter, breather cap and magneto can be painted black or the color of your choice. I painted the top half of my magneto black and the bottom half silver.

BLOCK ASSEMBLY

I noticed that the Parma engine is designed to be powered and allows a small motor (such as a 380) to make the belts and pulleys turn. It isn't that difficult to energize it; here's how:

- Get a small motor that fits in the block, and mount it on the center plate (part no. 8). You'll have to cut off the small nub that's on the side of the center plate. It

You can use any wire for the spark plugs, but I'd lean more toward using the yellow wire/black boot or red wire/black boot combinations before using the white wire/pink boot combination that comes with the kit.

Popular engine mod in authentic scale detail

doesn't have to be perfectly smooth when you've finished—just flat enough not to interfere with the motor mounting.

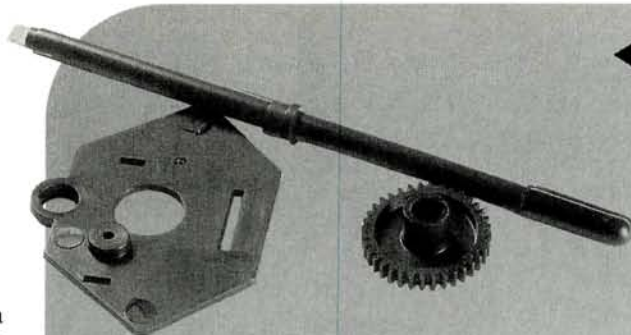
- Assemble the center plate, gear and shaft. If you have the kit, don't put part no. 7 on yet. Take your small motor and place it in position on the center plate. Then drill the motor-mounting screws and mount the motor on the plate. It will probably help if you make small slots for motor mounting so that you'll be able to adjust the gear mesh. I'd also use a little Loctite on the motor-mounting screws, just in case. Just don't get the Loctite on the center plate, or it might eat the plastic. Once the motor has been mounted on the center plate, go ahead and put part no. 7 on. If you don't want to use the bell housing (part no. 15) and would rather use the motor-mounting plate, you'll have to shorten the shaft.

- Pay attention to the belt alignment as you build the kit. If the pulleys are out of alignment, the belt will go flying. As you put the engine together, everything should be pretty well in alignment, but it is wise to double-check and test the system before you go too far into wiring and detailing. If you decide not to use a motor to drive the belts and pulleys, the belt alignment won't be quite as critical, but it will sure look funny if the belt isn't at least close to being properly aligned.

- If the belts aren't lining up quite right, it might be that the shafts (part nos. 20 and 44) are flexing when you put the rubber band on. To remedy this, coat the shaft with epoxy and put an aluminum or brass sleeve over the shaft. Once the epoxy has cured, the shaft will be a lot stiffer. Overall, the engine should go together without any problems.

PLUG WIRES AND FUEL LINES

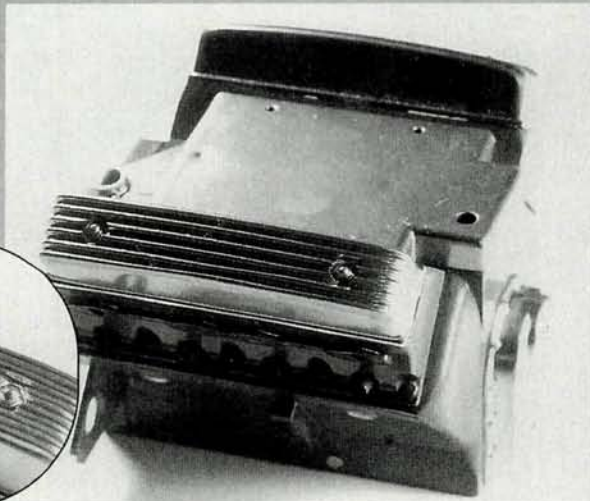
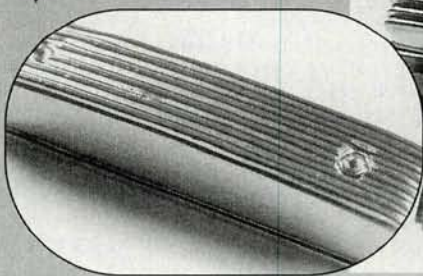
Careful plug-wire and fuel-line routing adds an extra level of realism to the kit, but I feel the supplied plug wires—white plug wire with pink boots—are a little less than realistic. I've never seen a combination like that before! If you decide to go ahead and use the wire supplied in the kit, that's fine. But if you feel like snooping around for a different color, more power to you. I used yellow wire left over from Parma's Hemi detailing kit (I save everything). Yellow wire simulates Accel-brand spark-plug wires; red simulates



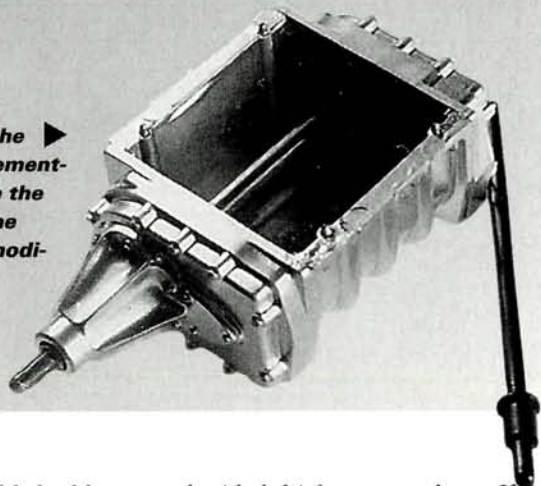
◀ **The main gear shaft is on top; to the left is the center plate; to the right is the center gear. When assembled, these parts allow you install a motor that turns the Parma engine's main gear shaft and, with it, the bottom pulley.**

The basic block setup, ▶ minus the main gear shaft.

As an additional detailing trick, paint the fins on the tops of the valve covers. ▶



I put a metal sleeve over the blower pulley shaft and cemented it with epoxy. Compare the shaft that I stiffened (in the blower case) with the unmodified shaft on the right. ▶



Mallory wires; and blue could double as Taylor wires. As for the plug boots, I used black silicone wire jacket that I had pulled off some old mechanical speed controls.

When you put the spark-plug wires on the motor, be sure to drape them in gentle arcs as they go from the magneto to the plugs; don't make hard bends. Pay close attention to the routing around the headers as well; on a real small-block Chevy, the two center header pipes are a little closer to each other than they are to the front and rear pipes. The wires are usually routed through the wider gaps. The plug wires for the first two cylinders go between the first and second header pipes, and the wires for the last two cylinders go between the third and fourth header pipes.

You have two choices for the fuel lines: use the black rubber line that comes with the kit, or go to your local hobby shop and buy some braided line that simulates

braided, high-pressure hose. If you decide to go with braided line, you can buy small, aluminum, hex-shaped ends that make good replicas of threaded compression fittings. You can get the anodized-aluminum look by using a fine-point permanent marker to color the hex ends (red, blue and yellow work well). Heat-shrink tubing can also be applied and painted to similar effect, but the hex fittings look the best.

If you use the included rubber lines and are fanatical about detailing, paint a small silver line around both ends of each one to simulate hose clamps. For a brighter effect, apply thin strips of "chrome" self-adhesive Mylar (check the R/C airplane section of your local hobby store for this).

PAINT TRICKS

Many parts in the small-block kit are finned or ribbed, and there's a detailing

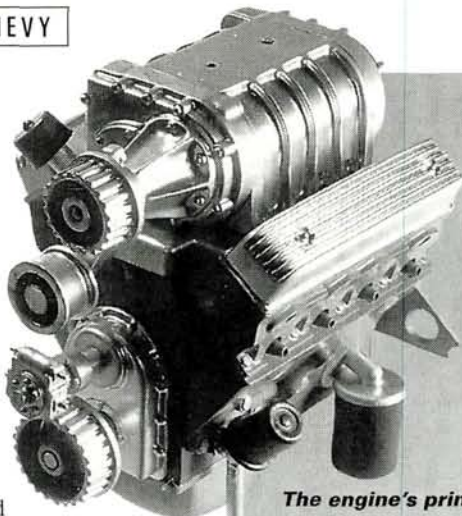
opportunity there, too. On full-size cars, the fins are often painted a different color from the rest of the part. Let's say you painted your engine block and heads red and both valve covers silver. You could paint the fins on the top of the valve covers red to match the block and heads.

There are a couple of ways to do this: use a really fine paint-brush, and hand-paint the fins (time-consuming and you must have a steady hand); or wrap a small piece of clean cloth around the tip of your finger, dab some paint onto the cloth, and gently run your finger over the top of the fins to apply the paint. This method works well on the valve covers and on the blower body.

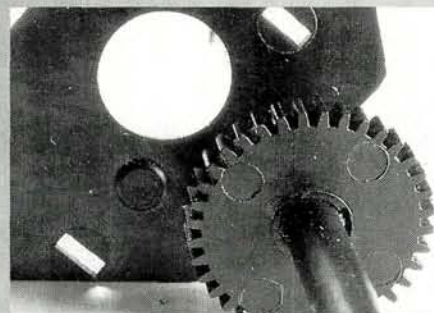
FINAL THOUGHTS

If you like scale detail, especially if you've done any scale modeling in the past, you ought to pick up a Parma small-block engine kit. It goes together easily and, with the included extra parts, you can build it in any way you want. There's plenty of room for your imagination.

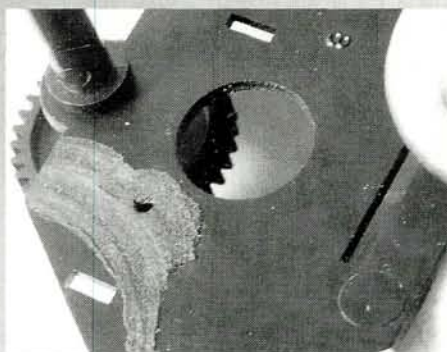
*Addresses are listed alphabetically in the Index of Manufacturers on page 209.



The engine's primary "hard parts" assembled and ready to go.



Before you go looking for the right pitch gear to mesh with the center gear, let me help you out: it's a standard 48-pitch.



There's a small nub on one side of the center plate. To mount a motor in the "engine," you'll have to remove this nub; if you don't, the motor won't sit flat against the center plate. (A Dremel tool offers the easiest way to remove the nub.)

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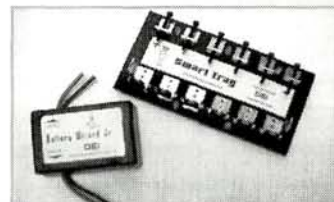


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PERFORMANCE

After running a few tanks through the Racer in the *R/C Car Action* parking lot, I prepared for a trip to R/C Madness in Enfield, CT. One of the best facilities in the area, it has three tracks—off-road, paved roadcourse and indoor carpet oval.

My day of racing turned out to be an exercise in what *not* to do! I'll explain. To avoid any conflict with rules on width (some clubs run 190mm maximum width to be consistent with the electric cars), I narrowed the Racer to 190mm—a rather labor-intensive process that requires new drive shafts and front upper links. What's worse is that once you've narrowed the car, you can't widen it until you buy new rear suspension arms. In this narrow configuration, the outer portion of the rear arms will most likely interfere with the rear wheels. To return the car to its original width, you have to replace the rear arms! As luck would have it, R/C Madness allows a 200mm width—mistake no. 1.

R/C Madness also allows the use of cap tires, which, in my opinion, are better than even the best glue-on tires. They last infinitely longer and typically provide better traction. I marched into the

trackside hobby shop and plopped down 60 bucks for a full set of yellow-compound Pro-Line/Jaco* pre-mounted slicks—mistake no. 2.

It soon became evident that the narrow chassis with the ultra-sticky tires and my very rusty driving skills meant a less than admirable driving exhibition. At the end of the long back straight, there's a 90-degree off-camber turn that has a noticeable bump at its entrance. This was the site of numerous traction rolls. Ditto for the 180-degree turn at the end of the front straight. Out of a field of four, I managed to qualify a distant second to the local hotshot Richard (also running a Nitro RS4).

When I wasn't too cautious and my driving skills permitted, I could easily run with the fastest car on the track. The power of the O.S. CV engine combined with the Paris turbo ring pipe is so incredible it's almost excessive. Even though my test was something of a disappointment, Richard showed us all how a properly set up Nitro RS4 can run, and I tell you, it's a rocket!

After my experiment, I made a trip to the local hobby shop to return the Racer to its original configuration. Subsequent

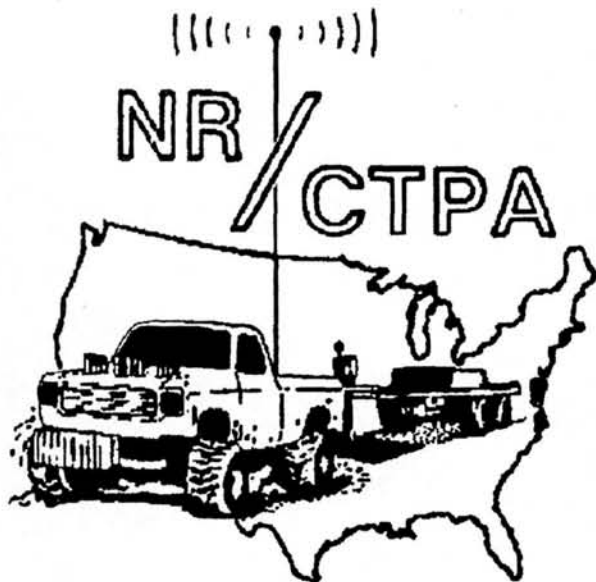
runs proved that I should have left the car alone. In the wider configuration, handling is exceptional and the steering is far greater than I expected from a 4WD sedan—so good, in fact, that I went to a harder-compound front tire to limit the steering!

FINAL THOUGHTS

What did I learn about the Nitro RS4 Racer? It represents an excellent balance of economy and performance. At the same list price as the standard Nitro RS4, sans body and engine, it's a great value that allows racers their choice of powerplant and body. It isn't a "cost-is-no-object" car. Some other car kits include every super-tech high-dollar performance part their manufacturers could possibly squeeze in, but that isn't what the Racer is all about. HPI's objective appears to be to maximize the performance-per-dollar ratio, and with the Racer, the company hits the proverbial nail right on the head.

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KYOSHO REPSOL FORD ESCORT

(Continued from page 66)

was the big tabletop jump to see how the Escort would handle a little air time. After only a couple of jumps, it was evident that two things about the Escort require some attention.

First, after getting only about 6 inches of air, the Escort landed on its left rear wheel, and this broke the hub carrier where the upper suspension link is attached; it appears that the material used for the hub carriers is a little brittle. (An old trick of mine to prevent this type of breakage was to soften the suspension components in a pot of boiling water. I don't know if this would work with the Escort Rally's material, but it might be worth a try.)

The second trait worth noting about the Escort Rally is that it's a little nose-heavy. Hitting a jump at a constant speed would typically send it nose first into the dirt. To keep the car level while it was in the air, a quick shot of acceleration was necessary on the way up the face of the jump. Other than a little attitude problem (flying, that is), and one broken suspension part, my Escort Rally is a great "fun" car. It's mostly assembled right out of the box, and this relieves newcomers of that task and allows them to get right down to the business of thrashin'!

**Addresses are listed alphabetically in the Index of Manufacturers on page 209.* ■

TAMIYA DAVID JUN EDITION

(Continued from page 74)

the 94157. A Novak* Atom programmable electronic speed control (ESC) was called in because I wanted the smoothest and lightest unit I could get my hands on. A Novak Mercury receiver also fit nicely on the side of the rear gearbox.

Topping off the car is one of Protoform's* new Nissan Primera bodies. Dale Epp sent me one to test, and I decided that the DJ Edition was the chassis it should be mounted on. This required a little modification of the rear mounts by shortening and drilling in the body posts, but the results were well worth the extra effort.

PERFORMANCE

The test site for the David Jun Edition TA03F was R/C Madness in Enfield, CT. Before I set the car on the ground, I switched from the stock A-compound reinforced slicks that worked very well in the parking lot to Pro-Line's S2-compound slicks.

I made a few laps with the S2 tires and found that the car pushed entering the tight corners. I made another quick tire swap and installed a full set of Pro-Line/Jaco pre-assembled slicks. Wow! What a difference!

The DJ Edition took off smoothly and cleanly and accelerated rapidly, thanks to its lightweight, efficient drive train. Then I started maneuvering through the corners. The car was on rails. All I had to do was

keep squeezing the throttle trigger through the turns, and the car did the rest. I consistently hit my mark on each corner and exited with authority each and every time.

While I was really putting the car through its paces, I unintentionally checked out its durability several times. The most horrific incident was a head-on, full throttle impact that sent the car pirouetting through the air until it landed on its roof two lanes over. The only damage was a scratch on the body and the shock popped off the bottom ball joint. I just snapped the shock back on and was throwing down some more fast laps moments later.

FINAL THOUGHTS

The sedan racing rage shows absolutely no signs of slowing down; it's now so large that almost every manufacturer has jumped on board. There are so many hop-ups that I can't keep up with them. To be competitive, sometimes you have to upgrade your car. This is where the David Jun Edition stands above the rest. You need not worry about which options you should buy from which company. Tamiya includes all the factory upgrades that David Jun used to win the ROAR and NORRCA Nationals. So if you want to hop on the sedan bandwagon and don't want to invest countless hours and money on tuning options, check out the TA03F Pro David Jun Limited Edition.

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OFNA Z10 PRO NITRO

(Continued from page 62)

receiver pack lasted; I had about 40 to 50 minutes of solid run time before the servos showed signs of slowing.

FINAL THOUGHTS

I have always had good luck with OFNA vehicles. I have been running the Ultra Worlds GT for the past year in off-road competition and have quite a few wins under my belt. This year, with the opening of R/C Madness' touring-car track, I plan to take the Nitro Z10 Pro and my electric Z10 Pro and see how many more wins I can rack up. The Z10 was easy to drive and proved to be extremely durable after a few traction-roll crashes. The Nitro Z10 Pro is a great value and an excellent racecar, as well. If you're looking for a gas tourer to add to your stable, be sure to look into the feature-packed Nitro Z10 Pro.

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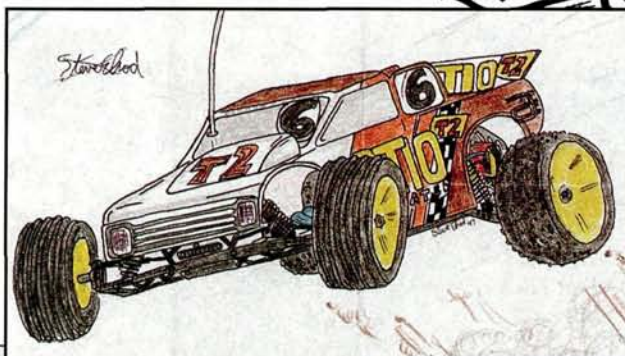
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MacSkippy's Gallery

Well, now, I think it's been just a wee bit too long since we heard from our more creative R/C enthusiast friends. Some love Monet and Renoir, while Mondrian and Warhol do it for others; go figga! The point is, someone out there will inevitably find beauty in every one of these renderings. So who am I to say which is best? In that spirit, I award each of these fine lads a free one-year subscription to *R/C Car Action* (or an extension of your existing subscription; I'm certain you're all smart enough to already be subscribers). Congratulations, boys! Your courage—to say nothing of your artistic talent—does me proud! Onward!

Steve Elrod
Kingsburg, CA

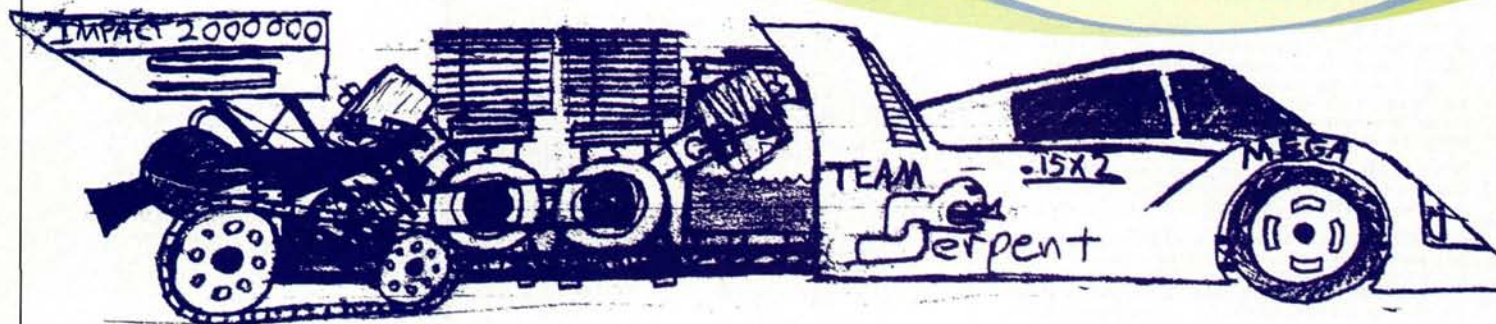
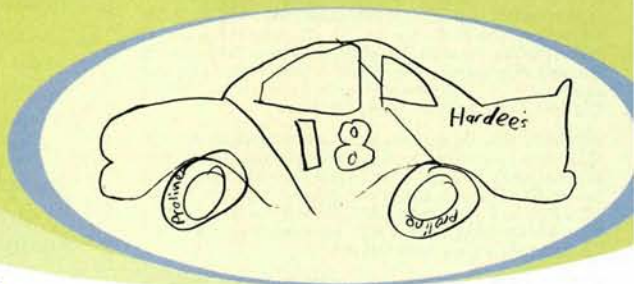


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